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**ISO**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION  
R 1020**

CINEMATOGRAPHY

**DIMENSIONS OF DAYLIGHT LOADING SPOOLS  
FOR DOUBLE-8 mm MOTION-PICTURE FILM**

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## BRIEF HISTORY

The ISO Recommendation R 1020, *Cinematography – Dimensions of daylight loading spools for double-8 mm motion-picture film*, was drawn up by Technical Committee ISO/TC 36, *Cinematography*, the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of a Draft ISO Recommendation.

In November 1966, this Draft ISO Recommendation (No. 1050) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Belgium	Germany	Netherlands
Brazil	Greece	Romania
Bulgaria	Hungary	Sweden
Canada	Israel	Switzerland
Chile	Italy	U.A.R.
Czechoslovakia	Japan	United Kingdom
France	Korea, Rep. of	U.S.A.

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in March 1969, to accept it as an ISO RECOMMENDATION.



**CINEMATOGRAPHY**

**DIMENSIONS OF DAYLIGHT LOADING SPOOLS**

**FOR DOUBLE-8 mm MOTION-PICTURE FILM**

**1. SCOPE**

This ISO Recommendation specifies the dimensions of daylight loading spools for double-8 mm motion-picture film.

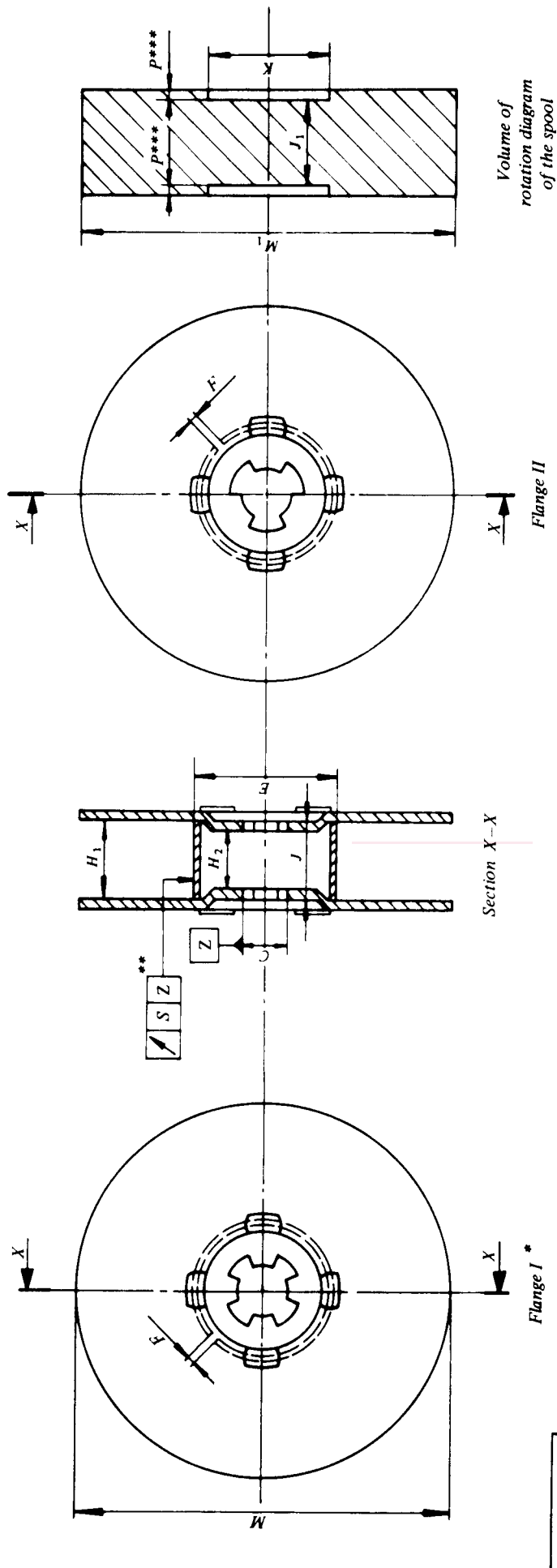


FIG. 1 - Dimensions of daylight loading spools for double-8 mm motion-picture

\* Flange I is provided on the side which engages the take-up spindle.

\*\* See clause 2.8. This symbol signifies the runoff of the cylindrical surface of the core with respect of the Z axis in the manner prescribed in ISO Recommendation R 1101, Tolerances of form and of position - Part 1: Generalities, symbols, indications on drawings.

\*\*\* See clause 2.6 for an explanation of P.

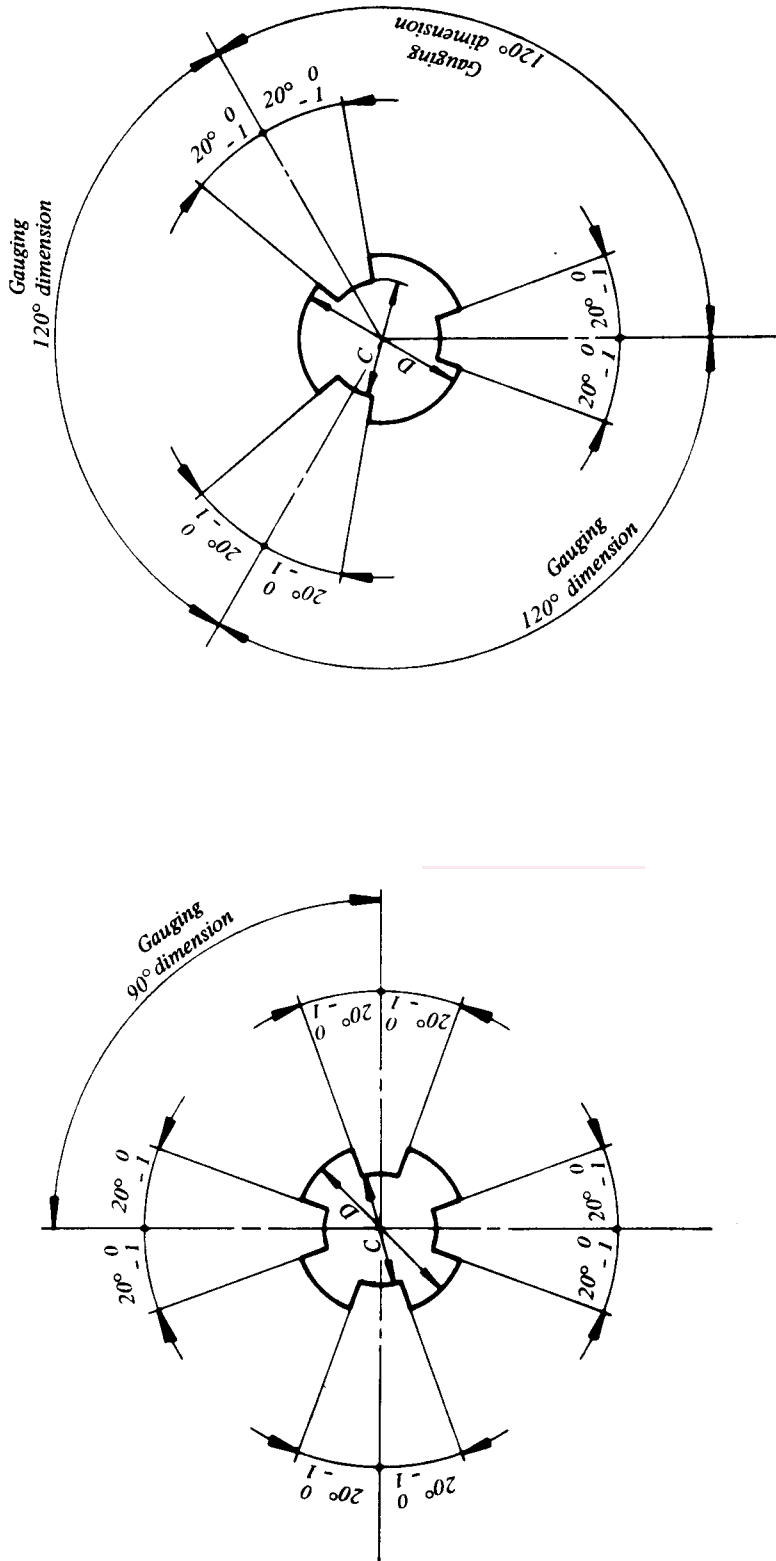


FIG. 2 - Enlarged views of 3 and 4-spined spindle holes

TABLE - Dimensions of double-8 mm nominal spool sizes

Dimension	Nominal spool size	millimetres	inches
<i>C</i>	7.5 m, 15 m, 30 m	7.30 $\begin{smallmatrix} +0.20 \\ 0 \end{smallmatrix}$	0.287 $\begin{smallmatrix} +0.008 \\ 0 \end{smallmatrix}$
<i>D</i>	7.5 m, 15 m, 30 m	9.8 $\begin{smallmatrix} +0.2 \\ 0 \end{smallmatrix}$	0.38 $\begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix}$
<i>E</i>	7.5 m	19.0 $\pm 0.3$	0.75 $\pm 0.01$
	15 m, 30 m	32.0 $\pm 0.5$	1.26 $\pm 0.02$
<i>F</i>	7.5 m, 15 m, 30 m	see clause 2.3	
<i>H</i> <sub>1</sub>	7.5 m, 15 m, 30 m	16.05 $\begin{smallmatrix} +0.35 \\ 0 \end{smallmatrix}$	0.632 $\begin{smallmatrix} +0.014 \\ 0 \end{smallmatrix}$
<i>H</i> <sub>2</sub>	7.5 m, 15 m, 30 m	16.00 min.	0.630 min.
<i>J</i> and <i>J</i> <sub>1</sub>	7.5 m, 15 m, 30 m	18.5 $\begin{smallmatrix} 0 \\ -0.4 \end{smallmatrix}$	0.73 $\begin{smallmatrix} 0 \\ -0.02 \end{smallmatrix}$
<i>K</i>	7.5 m	15.6 min.	0.61 min.
	15 m, 30 m	25.5 min.	1.00 min.
<i>M</i> and <i>M</i> <sub>1</sub>	7.5 m	52.0 $\begin{smallmatrix} 0 \\ -0.8 \end{smallmatrix}$	2.05 $\begin{smallmatrix} 0 \\ -0.03 \end{smallmatrix}$
	15 m	71.5 $\begin{smallmatrix} 0 \\ -1.0 \end{smallmatrix}$	2.81 $\begin{smallmatrix} 0 \\ -0.04 \end{smallmatrix}$
	30 m	92.0 $\begin{smallmatrix} 0 \\ -1.0 \end{smallmatrix}$	3.62 $\begin{smallmatrix} 0 \\ -0.04 \end{smallmatrix}$
<i>P</i> (See clause 2.6)	7.5 m	0.40 max.	0.016 max.
	15 m, 30 m	0.50 max.	0.020 max.
<i>S</i>	7.5 m	0.5	0.02
	15 m, 30 m	0.8	0.03

## 2. DIMENSIONS AND CHARACTERISTICS

- 2.1 The dimensions given above are for general purpose double-8 mm motion-picture film spools with nominal capacities of 7.5 metres (25 feet), 15 metres (50 feet), and 30 metres (100 feet). Spools for high-speed cameras generally should be more carefully balanced and are not necessarily covered by this ISO Recommendation.
- 2.2 If rivet heads, or other fastening devices, extend beyond the outer surfaces of the flanges, they should lie at a diameter larger than the minimum *K* diameter and should be within the boundaries defined by other portions of the volume of rotation diagram.

- 2.3 Dimension  $F$  represents a slot in the spool core for attaching the film. Its design and dimensions are critical if a spool is to operate satisfactorily, both in self-threading cameras and cassette-loaded cameras. In self-threading cameras the film should, without fail, seek out and easily slide into the slot, but for cassette-loaded cameras the slot should resist extraction of the film by action of the clock-spring at the end of the first camera exposure run.

Starting at a point adjacent to the four-splined flange and running at least one-half the core width, the slot should be designed to meet manual-threading, self-threading, and cassette-loading requirements. Slot sides may diverge over the remaining one-half of the core width. One way of accomplishing this is to design the slot in the form of a weaving channel with an effective separation of 0.15 to 0.25 mm (0.006 to 0.010 in) between the teeth on one side of the slot and the teeth on the other side of the slot as measured with a wide, stiff blade-gauge which should slip easily into this zone.

- 2.4 Dimension  $H_2$  is the space between the flanges inside the core, but outside the  $D$  diameter zone.
- 2.5 Dimensions  $J$  and  $J_1$  represent the thickness or effective thickness, respectively, of the spool within the  $K$  diameter area which is centered on the spindle hole axis of each flange.
- 2.6 A reference plane of rotation for each flange is defined by a plane perpendicular to the axis of the spindle and coincident with the surface of a flat 15.0 mm (0.59 in) diameter support which is in contact with the flange and centered on the spindle hole axis of the flange.

The dimension  $P$  is the distance measured outwardly from this reference plane\* of rotation to the farthest plane of rotation described by any point on the flange outside the  $K$  diameter area when the spool is rotated on an accurate, tight-fitting spindle. This includes rivets or other fastening devices, variations in flange thickness, flatness, and lateral runout of the flanges.

Selection of a dimension  $P$  value is dependent upon the thickness of the material used for the flanges. According to the flange material thickness :

- (a) the  $K$  diameter area may be depressed (with  $P$  greater than zero), or
  - (b) the outside surfaces of the flanges may be flat from spindle hole area to periphery (with  $P$  equal to zero), or
  - (c) in the case of flanges made of very thin material, the  $K$  diameter area may be raised rather than recessed (effectively,  $P$  less than zero).
- 2.7 The maximum effective thickness of spools (including all the characteristics mentioned in clause 2.6) outside the  $K$  diameter area has not been stated because it is a function of a spool's specific  $J_1$  value between the 15.0 mm diameter reference zones on each flange. The largest over-all effective thickness, however, will be  $J_1 \text{ max.} + 2 \times P \text{ max.} = 19.5 \text{ mm (0.77 in)}$ .

\* The reference plane from which  $P$  is measured is not necessarily coincident with all points within the  $K$  diameter area but should only be coincident with those which are in contact with the reference support which has a diameter smaller than  $K$ .

2.8 The eccentricity of the core with respect to the spindle hole axis, *Z*, should not exceed a *total* radius variation (total indicator reading) of

- 7.5 mm spool . . . . . 0.5 mm (0.2 in)
- 15 mm spool . . . . . 0.8 mm (0.3 in)
- 30 mm spool . . . . . 0.8 mm (0.3 in)

2.9 When a thin flange material is used for flanges, Annexes B and C should be taken into account.

NOTES

1. When the loaded camera is viewed from the side, with the lens to the left, and the bottom of the housing downward (regardless of whether or not the spool loading mechanism is visible from that side), both the supply and the take-up spools rotate in a clockwise direction.
2. Flanges should be opaque and their surfaces should have low reflectance characteristics.
3. To facilitate distinguishing between a roll of film which has been exposed along the first side (one-half width) only and one which has not been exposed at all or has been exposed along both the first and second sides (both one-half widths), it is recommended the flanges of spools be marked prominently as follows :

RECOMMENDED MARKINGS

Film manufacturers' raw stock spools		Camera accessory spools	
	Numeral		Numeral and/or phrase
Flange with 4-splined spindle hole	1	2	No phrase (or numeral) necessary if phrase shown below is included on other flange.
Flange with 3-splined spindle hole	2	1	Phrase as follows or equivalent : film when on this spool is half exposed.

Attention is called to the fact that if a camera accessory spool wound with the first exposure run of film is removed from the camera, identification of the film exposure status is more obvious if the spool has been marked with a phrase instead of (or in addition to) numerals. Some camera accessory spools have identical 4-spline holes in each flange. (Supply spindles of such cameras have one small lug or none at all.) Both flanges of such accessory spools should be marked with the phrase suggested above; to insure proper orientation for the second exposure in this case, in addition to the phrase, it is helpful to have the numeral 1 on one flange and the numeral 2 on the other.