INTERNATIONAL STANDARD 1793

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

Cinematography — Reels for 16 mm motion-picture projectors (up to and including 120 m capacity : 18 cm size) — Dimensions

Cinématographie — Bobines de projection pour film cinématographique 16 mm (capacité maximale : 120 m pour le format 18 cm) — Dimensions

First edition — 1975-07-01

UDC 778.553.4 : 771.531.352

Ref. No. ISO 1793-1975 (E)

Descriptors : cinematography, motion-picture film — 16 mm, bobbins, motion-picture projectors, dimensions.

Price based on 4 pages

FOREWORD

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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 1793 was drawn up by Technical Committee ISO/TC 36, *Cinematography*, and circulated to the Member Bodies in August 1974.

It has been approved by the Member Bodies of the following countries :

Australia	Germany	Sweden
Austria	India	Switzerland
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The Member Body of the following country expressed disapproval of the document on technical grounds :

U.S.A.

Printed in Switzerland

Cinematography — Reels for 16 mm motion-picture projectors (up to and including 120 m capacity : 18 cm size) — Dimensions

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the dimensions and characteristics of 16 mm motion-picture film projection reels with nominal flange diameters of 7 cm (3 in), 10 cm (4 in), 13 cm (5 in) and 18 cm (7 in).

2 REFERENCES

ISO 1019, *Cinematography — Spools, daylight loading type for 16 mm motion-picture cameras — Dimensions.*

ISO 1116, *Microcopying — 35 mm and 16 mm microfilms, spools and reels — Specifications.*

ISO 3647, *Cinematography — Spindles for 16 mm motion-picture camera spools and projector reels — Dimensions.*

ISO . . ., *Cinematography — Reels for 16 mm motion-picture projectors (over 120 m capacity) — Dimensions.* [1]

3 DIMENSIONS

3.1 The dimensions shall be as shown in the figures and given in the tables.

3.2 The tip of the keyway, if rounded as shown in figure 2, may have a minimum radius of $B/2$. If, instead, the tip of the keyway is made square as illustrated by the chain line, the square tip still shall observe the limits of A.

3.3 Dimension J_1 applies within the zone of diameter K which is centred on the spindle hole axis. It is not intended to imply, however, that this zone must be a depressed area. Depending upon the values selected for J_1 and P, the entire flange might be flat or the zone of diameter K might even be slightly raised.

3.4 The outside surfaces of the flanges which lie outside the zone of diameter K shall fall between the planes defined by $J_1 + 2P$.

3.5 Dimension P is the distance measured outwardly from the reference plane to the plane of rotation generated by the thickest and/or most eccentric point on the flange outside the zone of diameter K when the reel is rotated on an accurate, tight-fitting spindle. This includes rivets or other fastening devices, variations in flange thickness, flatness and lateral run-out of the flanges.

The reference plane of rotation for each flange is defined as 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 centred on the spindle hole axis of the flange.

NOTE — The reference plane from which P is measured is not necessarily coincident with all points within the zone of diameter K, but only needs to be coincident with those which are in contact with the reference support which has a diameter smaller than K.

4 CHARACTERISTICS

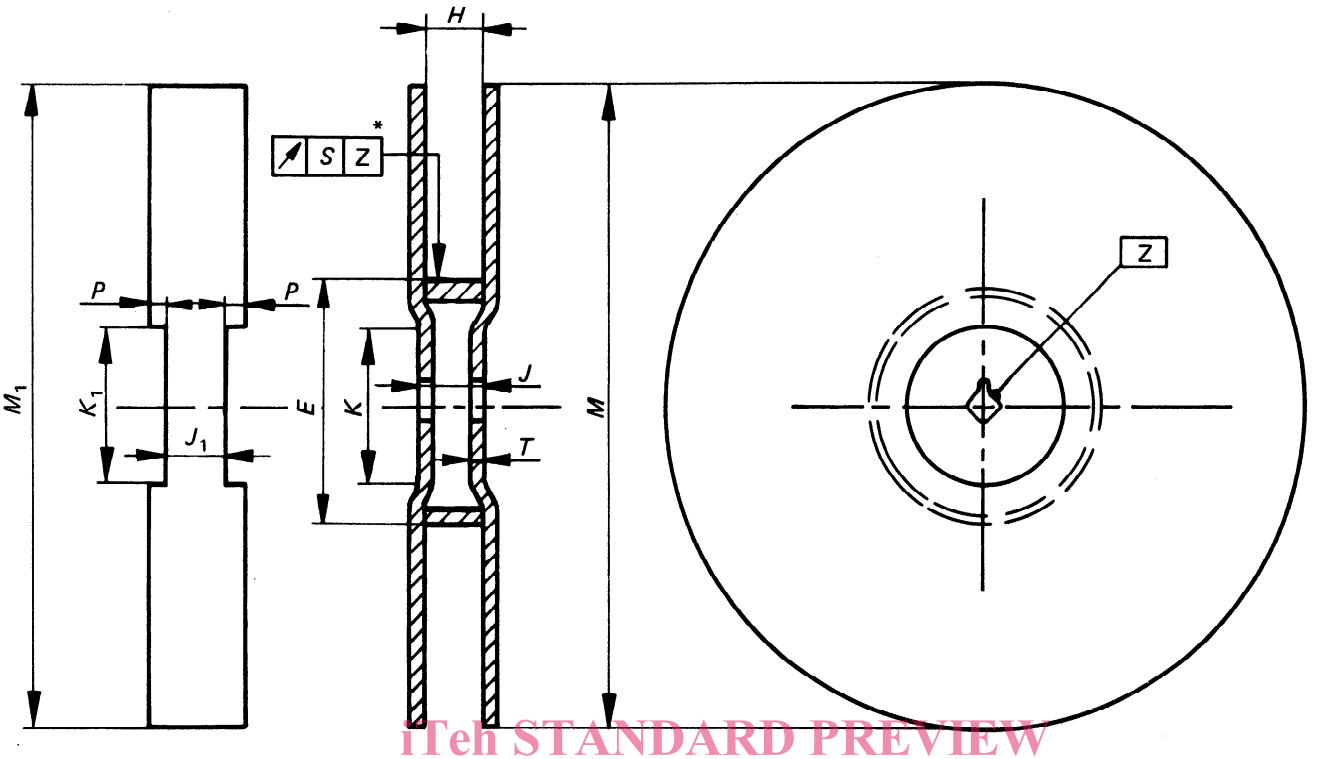
4.1 Each flange, preferably, shall have a square spindle hole with corner keyway with dimensions as illustrated; alternatively, one flange may have a round spindle hole with a diameter of C (and no keyway).

4.2 If square spindle holes with corner keyways are used in each flange, the holes shall be aligned so that a square test bar 8 mm × 8 mm (0.315 in × 0.315 in) may be passed completely through the reel. (It is also preferable that the keyways be aligned.) If a square spindle hole in one flange and a round spindle hole in the other flange are used, the holes shall be aligned so that a cylindrical test bar of 8 mm diameter may be passed completely through the reel.

4.3 Provision should be made for securing the end of the film so as to accept the full width of the film, and in such a way that the film will be freely released at the end of its run.

4.4 For reels with flanges up to and including 10 cm (4 in), the flanges shall be provided with holes permitting the ready observation of the film attachment device. For reels with flanges 13 cm (5 in) and greater, the flanges should also be provided with access holes below the film attachment device and of adequate size to furnish comfortable access for securing the film.

1) In preparation.



* This symbol signifies the radial run-out of the hub with respect to the Z-axis in the manner prescribed in ISO/R 1101.

FIGURE 1 — **Projection reel and maximum volume of rotation**

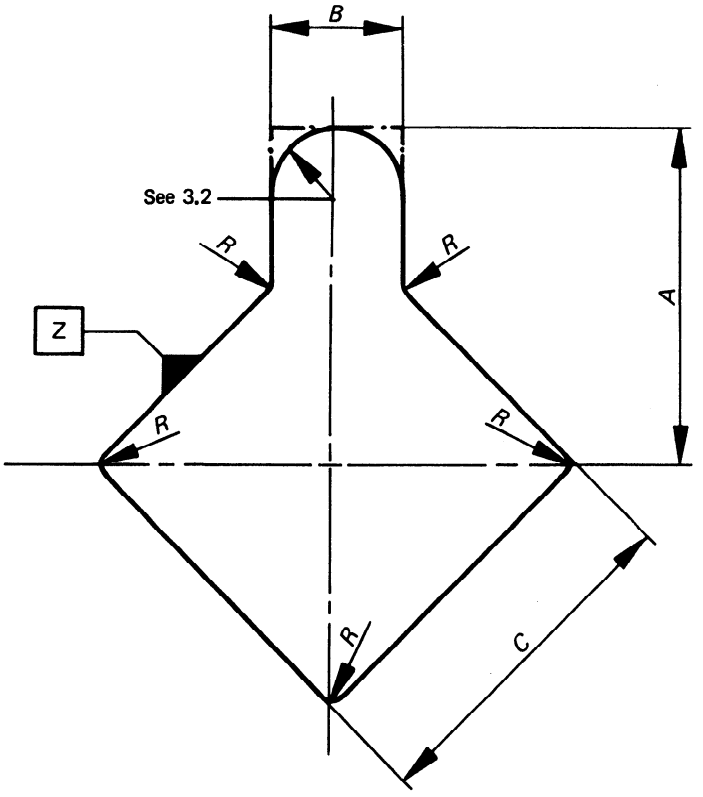


FIGURE 2 — **Enlarged view of spindle hole area**

TABLE 1 — **Dimensions not common to the four reel sizes**

Reel size designation** cm	Dimension	mm	in	Nominal reel capacity m	ft
7	*M* and M_1	$75{,}0\ ^{0}_{-1{,}0}$	$2.95\ ^{0}_{-0.04}$	15	50
	E	32,5 ± 0,5	1.28 ± 0.02		
	*P**	0,9 max.	0.035 max.		
10	*M* and M_1	$100{,}0\ ^{0}_{-1{,}0}$	$3.94\ ^{0}_{-0.04}$	30	100
	E	45,5 ± 0,5	1.79 ± 0.02		
	*P**	1,1 max.	0.04 max.		
13	*M* and M_1	$128{,}0\ ^{0}_{-1{,}0}$	$5.04\ ^{0}_{-0.04}$	60	200
	E	45,5 ± 0,5	1.79 ± 0.02		
	*P**	1,5 max.	0.06 max.		
18	*M* and M_1	$180{,}0\ ^{0}_{-3{,}0}$	$7.09\ ^{0}_{-0.12}$	120	400
	E	60,5 ± 0,5	2.38 ± 0.02		
	*P**	2,0 max.	0.08 max.		

* See 3.5.

** The reel size is the nominal flange diameter in centimetres; the corresponding inch sizes are 3, 4, 5 and 7.

TABLE 2 — **Dimensions common to all 16 mm projection reels**

Dimension	mm	in
*A**	$7{,}6\ ^{+0{,}5}_{0}$	$0.30\ ^{+0.02}_{0}$
B	$3{,}1\ ^{+0{,}4}_{0}$	$0.12\ ^{+0.02}_{0}$
*C***	$8{,}05\ ^{+0{,}10}_{0}$	$0.317\ ^{+0.004}_{0}$
H	$17{,}0\ ^{+1{,}5}_{0}$	$0.67\ ^{+0.06}_{0}$
J and J_1	20,0 ± 0,5	0.79 ± 0.02
K and K_1	25,5 min.	1.00 min.
R	0,2 max.	0.008 max.
S	0,8 max.	0.03 max.
T (See clauses A.2 and A.3)		

* See 3.2.

** If the reel or reel hub is made from plastics or other dimensionally unstable material, the spindle hole diameter *C* (for the 15 and 30 m reels) should be so adjusted that at least the minimum dimension is maintained through the normal use range of temperature and relative humidity.

ANNEX

A.1 SPINDLE-REEL FIT

Loose fit between a projector spindle and a reel spindle hole can contribute flange excursion not measured in the axial run-out measurement of sub-clause 3.4. This can be minimized by incorporating a support surface of not less than 16 mm (0.63 in) and preferably of 25 mm (0.98 in) diameter at the base of the spindle and by locking the *K* diameter area of the reel flange flush against this support.

A.2 REEL-LOCKING DEVICE

A few existing spindle designs have detent reel-locking means which act against the inside wall near the spindle hole of the flange which is placed closest to the base of the spindle. Thus, dimension *T* has been specified to ensure satisfactory performance on the spindles.

The value of dimension *T* should be $1{,}5\ ^{0}_{-0{,}8}$ mm ($0.06\ ^{0}_{-0.03}$ in).

To provide correct fastening of the reels, dimension *T* is considered to be necessary within the zone of diameter *K*, but for future spindle designs and construction, it has been recommended in ISO . . ., *Spindles for double 8 mm and 16 mm cameras and for 8 mm and 16 mm projectors**, that all locking means act against the full width J_1. Thus, eventually, the need for specifying *T* might be obviated.

A.3 PLASTIC RETURN REELS

Dimension *T* would require an unobstructed space within the hubs near those portions of the inside surfaces of both flanges which are near the spindle hubs. It is recognized, however, that most moulded "return" reels (those supplied by processors for return of film to customer) and most very large capacity reels (not listed in this International Standard) have spindle holes in the form of a solid-walled shaftway passing completely from one flange to the other.

* In preparation.

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