# INTERNATIONAL STANDARD

# ISO 1793

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# Cinematography — Reels for 16 mm motion-picture projectors (up to and including 610 m capacity: 38 cm size) — Dimensions

*Cinématographie — Bobines de projection pour film cinématographique 16 mm (capacité maximale: 610 m pour le format 38 cm) — Dimensions*

Reference number
ISO 1793:2005(E)

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# Foreword

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ISO 1793 was prepared by Technical Committee ISO/TC 36, *Cinematography*.

This second edition cancels and replaces the first edition (ISO 1793:1975), which has been technically revised.

# Introduction

This edition of ISO 1793 provides for large capacity reels from 60 m to 610 m. The first edition (1975) had reel capacity of 15 m to 120 m.

# Cinematography — Reels for 16 mm motion-picture projectors (up to and including 610 m capacity: 38 cm size) — Dimensions

## 1 Scope

This International Standard specifies the dimensions and characteristics of 16 mm motion-picture film projection reels.

## 2 Dimensions

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

**2.2** The tip of the keyway, if rounded as shown in Figure 2, may have a minimum radius $V/2$, 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 $U$.

**2.3** The outer surface of the flanges shall be flat out to a diameter of at least 31,75 mm (1,250 in). Dimension $J$ is the thickness of the reel over the area described by this diameter.

**2.4** Rivets or other fastening members shall not extend beyond the outside surfaces of the flanges more than 0,8 mm (0,03 in) and shall not extend beyond the overall thickness indicated by dimension $C$.

**2.5** Except at embossings, rolled edges and rounded corners, the limits shown shall not be exceeded at the periphery of the flanges, nor at any other distance from the centre of the reel.

**2.6** If spring fingers are used to engage the edges of the film, dimension $F$ shall be measured between the fingers when they are pressed outward to the limit of their operating range.

**2.7** Eccentricity of the flanges and hub with respect to the spindle hole axis shall not exceed the total variation shown in Table 2.

**2.8** Lateral runout shall be measured with respect to the common axis established by the round and square holes.

## 3 Characteristics

**3.1** Each flange, preferably, shall have a square spindle hole with dimension as illustrated; alternatively, one flange may have a round spindle hole with a diameter of $D$ (and no keyway).

**3.2** If square spindle hole with corner keyways are used in each flange, the hole shall be aligned so that test bar 8,02 mm (0,316 in) in diameter shall pass completely through the reel.

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

**3.4** Nominal values for dimensions $E$, $F$ and $G$ were chosen to provide lateral clearance for the film, which has a maximum width of 16 mm (0,630 in). However, a channel of the indicated width is narrow enough so

that the film cannot wander laterally too much as it is wound. If the channel is too wide, it is likely to cause loose winding of the film with resultant excessively large rolls.

At the hub, the tolerances applied to dimension $F$ are least because it is possible to control the separation fairly easily in that zone. At the region near the holes for the spindles, these tolerances are somewhat larger to allow for slight buckling of the flanges between the hub and the holes. At the periphery, the tolerances are still greater because it is difficult to maintain the distance with accuracy.

**3.5** The opening in the corner of the square hole, to which dimensions $U$ and $V$ apply, is provided to fit the spindles of 35 mm rewinds, which are used in some laboratories.

**3.6** Minimum and maximum values for dimension $T$, the thickness of the flanges, were chosen to permit the use of various materials.

**3.7** The outside diameter of the flanges was made as large as permitted by past practice in the design of projectors, containers for reels, rewinds and similar equipment. This was done so that the values of $B$ could be made as great as possible. As a result, there is less variation throughout the projection of a roll in the tension to which the film is subjected by the take-up mechanism. This is especially true if a constant-torque device is used.

**3.8** Film tension in a projector should be kept low to avoid perforation damage. In order to maintain low tension, it is necessary to keep the quotient $B/A$ (hub diameter $B$ divided by flange diameter $A$) as large as possible.

**3.9** A good projection reel must meet certain minimal physical strength requirements, particularly with respect to the flanges. A reel that meets this standard must pass the following test for flange rigidity.

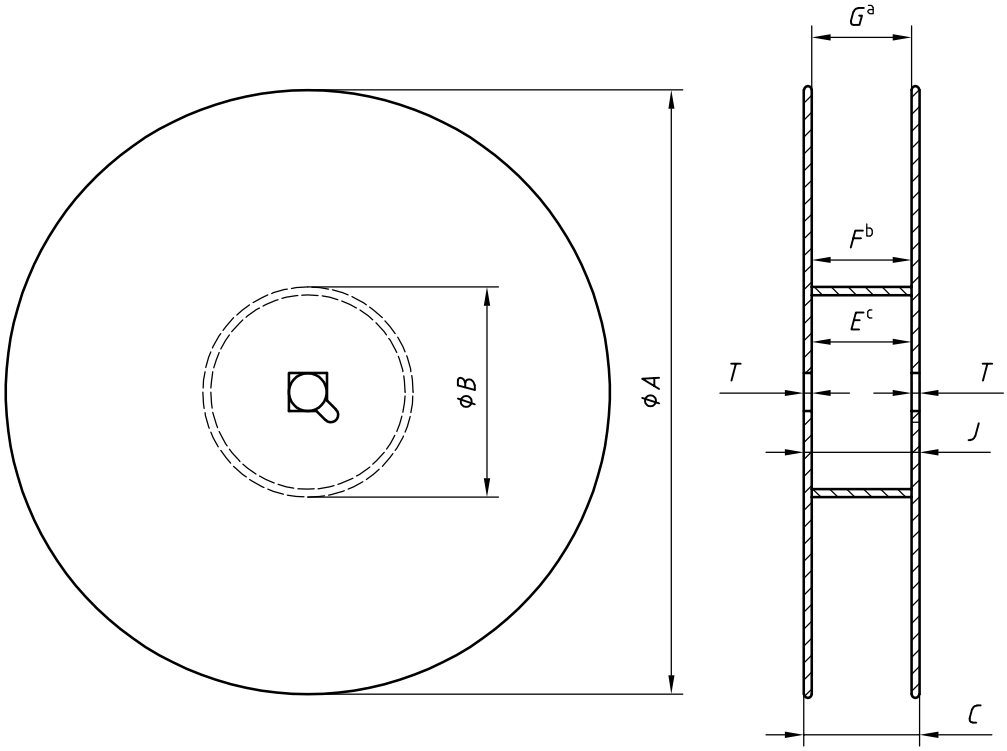
Make three posts that are placed 120 degrees apart and constructed so they support a short length of the rim of the reel for a distance of 3,0 mm (0,12 in) radially. Apply a load of 2,2 N (half pound) over a central area not greater than 31,8 mm (1,25 in) in diameter. Measure the vertical location of this area with a dial indicator. Add 4,4 N (1 pound) and measure again. Repeat the process on the other flange. The additional deflection caused by the 4,4 N load over that given by the 2,2 N load should be less than 0,89 mm (0,035 in).

**Table 1 — Capacity dimensions**

| Nominal capacity | Dimension A | | Dimension B | | Lateral runout | |
|---|---|---|---|---|---|---|
| | mm | in | mm | in | mm | in |
| 60 m (200 ft) | $127{,}79\ ^{+0{,}00}_{0{,}79}$ | $5{,}031\ ^{+0{,}000}_{0{,}031}$ | $44{,}45 \pm 6{,}35$ | $1{,}750 \pm 0{,}250$ | 1,45 max. | 0,057 max. |
| 120 m (400 ft) | $177{,}80\ ^{+0{,}00}_{0{,}79}$ | $7{,}000\ ^{+0{,}000}_{0{,}031}$ | $63{,}50\ ^{+0{,}00}_{1{,}90}$ | $2{,}500\ ^{+0{,}000}_{0{,}075}$ | 2,03 max. | 0,080 max. |
| 180 m (600 ft) | $234{,}32\ ^{+0{,}00}_{0{,}25}$ | $9{,}225\ ^{+0{,}000}_{0{,}010}$ | $123{,}82\ ^{+0{,}00}_{6{,}35}$ | $4{,}875\ ^{+0{,}000}_{0{,}250}$ | 2,03 max. | 0,080 max. |
| 240 m (800 ft) | $266{,}70\ ^{+0{,}00}_{0{,}79}$ | $10{,}500\ ^{+0{,}000}_{0{,}031}$ | $123{,}82\ ^{+0{,}00}_{9{,}52}$ | $4{,}875\ ^{+0{,}000}_{0{,}375}$ | 3,05 max. | 0,120 max. |
| 370 m (1 200 ft) | $311{,}15\ ^{+0{,}00}_{3{,}18}$ | $12{,}250\ ^{+0{,}000}_{0{,}125}$ | $123{,}82\ ^{+0{,}00}_{6{,}35}$ | $4{,}875\ ^{+0{,}000}_{0{,}250}$ | 3,56 max. | 0,140 max. |
| 490 m (1 600 ft) | $355{,}60\ ^{+0{,}00}_{6{,}98}$ | $14{,}000\ ^{+0{,}000}_{0{,}275}$ | $123{,}82\ ^{+0{,}00}_{6{,}35}$ | $4{,}875\ ^{+0{,}000}_{0{,}250}$ | 4,06 max. | 0,160 max. |
| 610 m (2 000 ft) | $381{,}00\ ^{+0{,}00}_{0{,}79}$ | $15{,}000\ ^{+0{,}000}_{0{,}031}$ | $123{,}82\ ^{+0{,}00}_{6{,}35}$ | $4{,}875\ ^{+0{,}000}_{0{,}250}$ | 4,34 max. | 0,171 max. |

**Table 2 — Other dimensions**

| Dimensions | | mm | in |
|---|---|---|---|
| $C$ | Total thickness (including flared, rolled or bevelled edges, if any) | 24,43 max. | 0,962 max. |
| $D$ | Spindle hole diameter | $8{,}10\ ^{0}_{0{,}08}$ | $0{,}319\ ^{0}_{0{,}003}$ |
| $E$ | Distance between flanges at spindle holes | $16{,}76 \pm 0{,}38$ | $0{,}660 \pm 0{,}015$ |
| $F$ | At hub | $16{,}76 \pm 0{,}25$ | $0{,}660 \pm 0{,}010$ |
| $G$ | At periphery | $16{,}76\ ^{+1{,}90}_{0}$ | $0{,}660\ ^{+0{,}075}_{0{,}000}$ |
| $H$ | Side of square spindle hole | $8{,}10\ ^{0}_{0{,}08}$ | $0{,}319\ ^{+0{,}000}_{0{,}003}$ |
| $J$ | Overall thickness at spindle hole | 20,07 max. | 0,790 max. |
| $T$ | Flange thickness (adjacent to spindle hole) | $2{,}67\ 0{,}69$ | $0{,}105\ 0{,}027$ |
| $U$ | Keyway depth | $8{,}38\ 0{,}51$ | $0{,}330\ ^{0}_{0{,}020}$ |
| $V$ | Keyway width | $3{,}18\ +0{,}13$ | $0{,}125\ ^{+0{,}005}_{0}$ |
| Flange and hub eccentricity | | 0,79 max. | 0,031 max. |

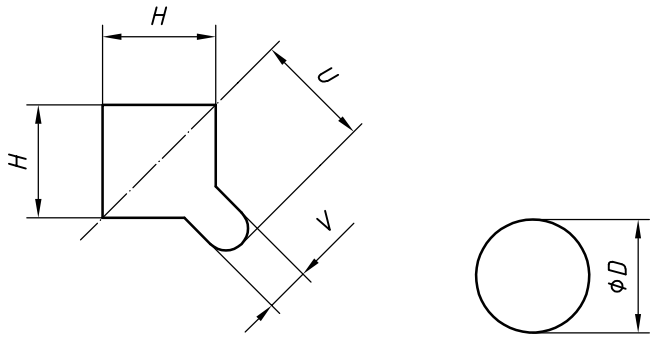



a At periphery.

b At hub.

c At spindle holes.

**Figure 1 — Plan view and cross-section of reel**




**a) Square hole** **b) Round hole**

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

# Bibliography

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