# INTERNATIONAL STANDARD

# ISO 7761

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# Micrographics — Single-core cartridge for 16 mm processed microfilm — Dimensions and operational constraints

*Micrographie — Cartouche à noyau unique pour microfilm de 16 mm traité — Dimensions et contraintes opérationnelles*

Reference number
ISO 7761:2004(E)

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# Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7761 was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 2, *Application issues*.

# Introduction

With the acceptance of this International Standard, future readers and reader-printers will be designed to accept cartridges used for storing and viewing processed 16 mm microfilm over a full range of specified tolerances.

Figure 4 provides the dimensions for a reel that provides additional clearance between the flanges of the reel and the inner walls of the enclosed cartridge described in Figure 2. Reels made to the specification in Figure 4 are suitable for all applications. Reels made to the upper limit of dimension $B$ (see Figure 3) may rub the inside wall of the enclosed cartridge. Figure 2 includes dimensions $2S$ and $2T$. The addition of the $2S$ dimension reduces the clearance of the flanges of the reel with the sides of the enclosed cartridge. The $2S$ and $2T$ dimensions are only necessary when an M-style cartridge reel (metal insert drive) is housed in the ISO 7761 standard enclosed case. These dimensions are necessary to control the wide leader in the M-style cartridge.

This International Standard also specifies the winding of the processed microfilm on the reel and the physical characteristics of the leading end of the film to ensure proper interfacing of the cartridges with automatic threading readers and reader-printers of different makes.

# Micrographics — Single-core cartridge for 16 mm processed microfilm — Dimensions and operational constraints

## 1 Scope

This International Standard specifies the dimensions of, and gives guidance on, the physical and performance characteristics of cartridges used for storing and viewing active-use 16 mm microfilm.

It includes physical and optical compatibility requirements as well as test procedures.

This International Standard does not apply to cartridges used for storing microfilm for archival purposes.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6148:2001, *Photography — Micrographic films, spools, and cores — Dimensions*

ISO 6196-1:1993, *Micrographics — Vocabulary — Part 1: General terms*

ISO 6196-2:1993, *Micrographics — Vocabulary — Part 2: Image positions and methods of recording*

ISO 6196-3:1997, *Micrographics — Vocabulary — Part 3: Film processing*

ISO 6196-4:1998, *Micrographics — Vocabulary — Part 4: Materials and packaging*

ISO 6196-5:1987, *Micrographics — Vocabulary — Part 5: Quality of images, legibility, inspection*

ISO 6196-6:1992, *Micrographics — Vocabulary — Part 6: Equipment*

ISO 6196-7:1992, *Micrographics — Vocabulary — Part 7: Computer micrographics*

ISO 6196-8:1998, *Micrographics — Vocabulary — Part 8: Use*

ISO 6199:1991, *Micrographics — Microfilming of documents on 16 mm and 35 mm silver-gelatin type microfilm — Operating procedures*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6196 apply.

# 4 Requirements for cartridge assembly

## 4.1 Dimensions

The following requirements pertain to the cartridge assembly, which is composed of the outer enclosure section (see Figures 1 and 2) and a reel (see Figures 3 and 4) assembled thereto and which is to be referred to as “the cartridge”.

The cartridges shall be in conformity with the dimensions given in either Figure 1 or Figure 2.

### 4.1.1 Open cartridge

The following requirements pertain to the cartridge in Figure 1, assembled with a reel (see Figures 3 and 4).

The cartridge clip (outer piece) shall conform to the dimensions given in Figure 1 and Table 1.

#### 4.1.1.1 Dimensional tolerances

For fillet radii: 0,40 mm minimum, 1,60 mm maximum.

For outside corner radii: 0,40 mm minimum, 0,80 mm maximum.

#### 4.1.1.2 Moulding tolerances

For general dimensions up to 25,4 mm ± 0,10 mm.

For each additional 25,4 mm ± 0,03 mm.

For parting-line dimensions up to 25,4 mm ± 0,10 mm.

For each additional 25,4 mm ± 0,03 mm.

#### 4.1.1.3 Wall thickness

General wall thickness: 2,0 mm unless otherwise noted.

#### 4.1.1.4 Ejector pins

Ejector pin marks acceptable: 0,00 raised 0,25 mm depressed.

#### 4.1.1.5 Recessed gate

Recessed gate acceptable if below surface.

#### 4.1.1.6 Contaminants

Parts shall be free of oil, wax, etc.

#### 4.1.1.7 Acceptable draft

Draft: 1° maximum per side. The dimensions shown on Figure 1 include draft.

### 4.1.2 Enclosed cartridge

The following requirements pertain to the enclosed cartridge in Figure 2, assembled with a reel (see Figures 3 and 4). The cartridge clip (outer piece) shall conform to the dimensions given in Figure 2. The dimensions in Table 2 shall be adhered to. The dimensions in Table 3 may be changed or eliminated to separately allow a lesser material section only.

**Table 1 — Cartridge dimensions (open type)**

Dimensions in millimetres

| | |
|---|---|
| *A* | 96,52 |
| *B* | 88,90 |
| *C* | 11,68 |
| *D* | 5,97 |
| *E* | 13,46 |
| *F* | 6,99 |
| *G* | 11,43 |
| *H* | 101,60 |
| *J* | 50,80 |
| *K* | 73,03 |
| *L* | 36,53 |
| *M* | 60,33 |
| *N* | 2,03 |
| *P* | 60,33 |
| *Q* | 25,40 |
| *R* | 2,03 |
| *S* | 25,40 |
| *T* | 25,40 |
| *U* | 25,04 |
| *V* | 92,20 |
| *W* | 21,84 |
| *X* | 0,51 |
| *Y* | 2,54 |
| *Z* | 3,05 |
| *AA* | 13,21 |
| *BB* | 4,83 |
| *CC* | 1,40 |
| *DD* | 3,68 |
| *EE* | 74,32 |
| *FF* | 14,83 |
| *GG* | 4,95 |
| *HH* | 3,56 |
| *JJ* | 15,49 |
| *KK* | 12,70 |
| *LL* | 39,62 |
| *MM* | 7,93 |
| *NN* | 2,54 |
| *PP* | 2,03 |
| *QQ* | 33,32 |
| *RR* | 30,17 |
| *SS* | 0,76 |
| *TT* | 73,03 |
| *UU* | 1,52 |
| *VV* | 30,18 |
| *WW* | 3,18 |
| *XX* | 15,24 |
| *YY* | 15,88 |
| *ZZ* | 1,02 |

**Table 2 — Cartridge dimensions (enclosed type) — Non-varying dimensions**

Dimensions in millimetres

| | |
|---|---|
| $A_1$ | 101,60 |
| $B_1$ | 50,80 |
| $C_1$ | 25,40 |
| $D_1$ | 11,43 |
| $E_1$ | 14,83 |
| $F_1$ | 74,32 |
| $G_1$ | 2,03 |
| $H_1$ | 39,62 |
| $J_1$ | 1,40 |
| $K_1$ | 3,68 |
| $L_1$ | 3,56 |
| $M_1$ | 2,54 |
| $N_1$ | 3,05 |
| $P_1$ | 2,03 radius |
| $Q_1$ | 96,52 diameter |
| $R_1$ | 7,92 |
| $S_1$ | 4,83 |
| $T_1$ | 4,95 |
| $U_1$ | 25,40 |
| $V_1$ | 6,98 |
| $W_1$ | 1,02 radius |
| $X_1$ | 35,56 |
| $Y_1$ | 92,07 |
| $Z_1$ | 50,29 |
| $(AA)_1$ | 47,09 |
| $(BB)_1$ | 19,61 |
| $(CC)_1$ | 38,10 diameter |
| $(DD)_1$ | 35,56 diameter |

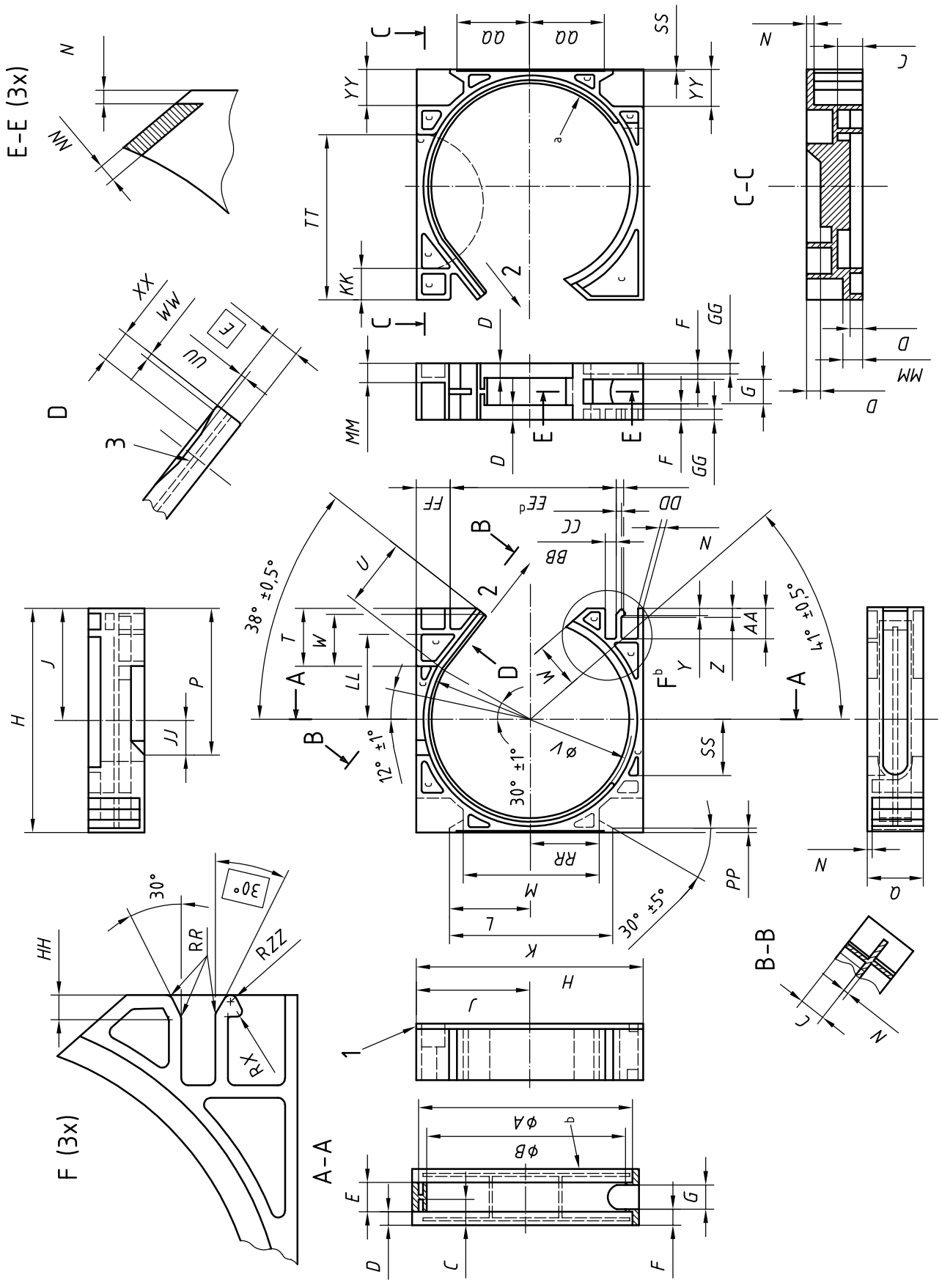
**Table 3 — Cartridge dimensions (enclosed type) — Dimensions with range**

Dimensions in millimetres

| | | |
|---|---|---|
| $A_2$ | 13,46 | max. |
| $B_2$ | 46,02 radius | max. |
| $C_2$ | 14,27 | max. |
| $D_2$ | 29,97 | max. |
| $E_2$ | 1,78 | min. |
| $F_2$ | 5,08 | max. |
| $G_2$ | 32,26 | min. |
| $H_2$ | 8,64 | min. |
| $J_2$ | 2,34 | min. |
| $K_2$ | 2,03 | max. |
| $L_2$ | 2,79 | max. |
| $M_2$ | 12,45 | min. |
| $N_2$ | 21,84 | max. |
| $P_2$ | 27,69 | max. |
| $Q_2$ | 21,59 | min. |
| $R_2$ | 44,65 | min. |
| $S_2$ | 21,08 | min. |
| $T_2$ | 90,04 diameter | min. |

## 4.2 Test at maximum speed

When used, the cartridge shall not damage the contained film to a degree that information contained in microimages is obliterated or becomes capable of ambiguity. The following test shall be made to ensure that the cartridge is finished correctly: unthread a 3 m strip of film at the maximum speed of the reader or other testing device; run the film backward and forward for 25 cycles; and check to see that it does not show any image deterioration. The film strip may be compared with reference prints made prior to the test.



**Key**

1 reference surface for dimension H
2 film path
3 tangent line of radius and staight section shall be smooth and free of any irregularities

a This surface shall be free of all imperfections, including flash and cold-flowed materials.
b 16 mm microfilm reel in accordance with Figures 3 and 4.
c Recess for moulding purposes only.
d Position unit in gauge to this dimension for checking other related dimensions.

**Figure 1 — Single core cartridge for 16 mm processed microfilm**

## 4.3 Materials

See Annex B.

### 4.3.1 Impact strength

Drop a cartridge, with 30,5 m of 0,130 mm thick film, from a height of 1,2 m onto a level, flat, steel surface four times: once on a corner, once on an edge, and once on each face. The cartridge shall withstand the test without rupture of the assembly and without impairment of use.

### 4.3.2 Test conditions

Testing to determine compliance with impact strength requirements shall be done under the following conditions: $(50 \pm 5)$ % relative humidity; 23 °C $\pm$ 2 °C. Samples shall be conditioned in the laboratory environment for 24 h before testing.

### 4.3.3 Compatibility

All materials for the cartridge shall be chosen so as not to cause loss of information on the film or loss of cartridge function.

Figure 3 shows reels, which are widely used but permit an overall flange width that could rub the walls of enclosed cartridges. Reels conforming to Figure 4 are of lesser width and suitable for applications covered by Figure 3.

## 4.4 Lubrication

The design shall be such that lubrication of the film or the cartridge is not required.

## 4.5 Markings

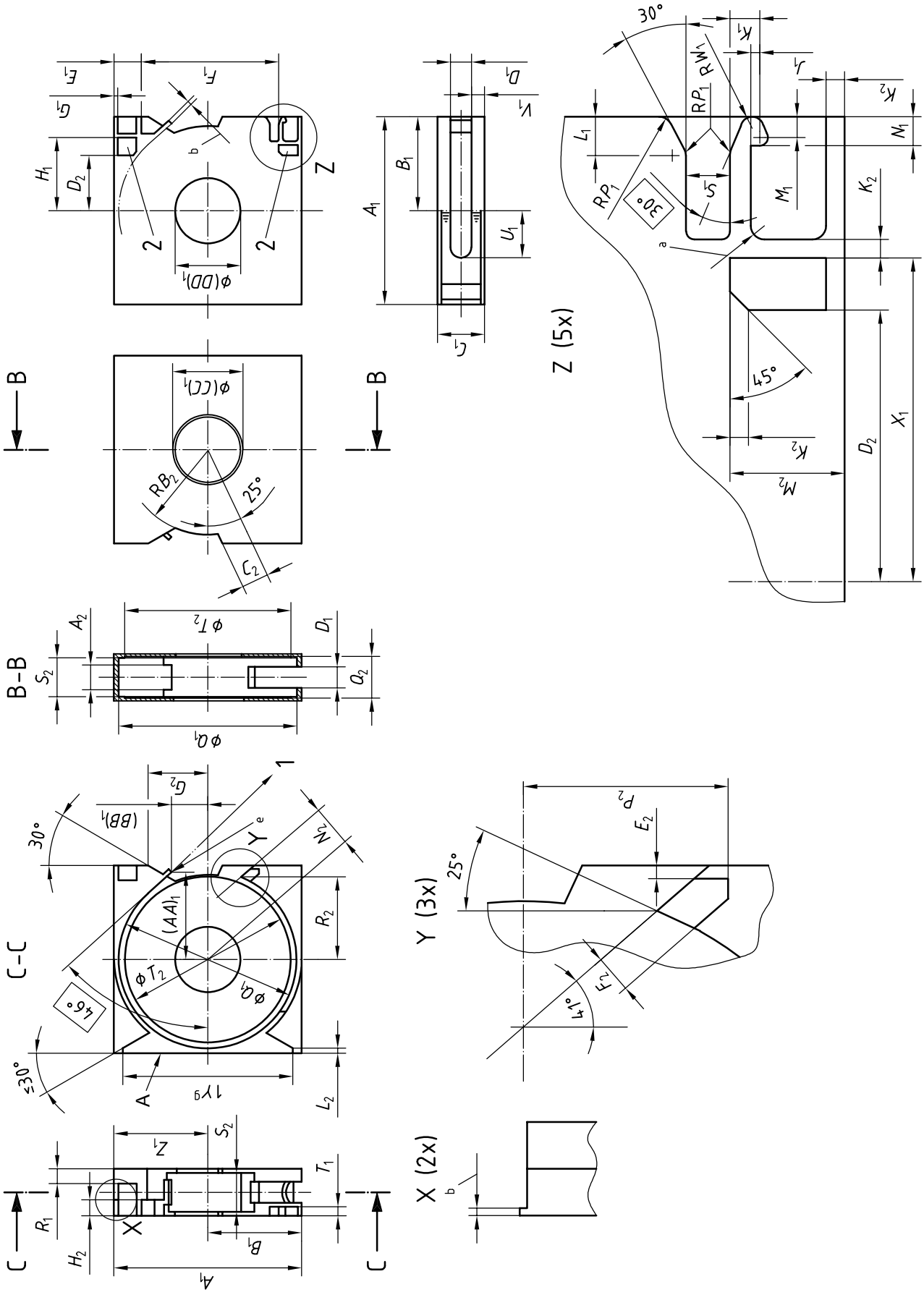
Any marking moulded in the cartridge case, either inside or outside, shall be flush with or below the surface level of the associated face.

## 4.6 Position of labels

Areas provided for labels shall be recessed and shall be positioned so that the information on the labels is not likely to be damaged when the cartridge is handled or, if there is a cover, when the cover is replaced or removed.

## 4.7 Surface finish

The inside surface finish shall be free of any flashing or moulding lines in the film path.



**Key**

1 film path

2 recessed depth $J_2$

NOTE 1 Locating and securing of cartridge halves at the discretion of the manufacturer.

a Fillet radii 1,60 mm max.

b General wall section 2,0 mm, unless otherwise noted.

c Tolerances for dimensions in Table 2: up to 25,4mm ± 0,10 mm for each additional 25,4 mm ± 0,03 mm
Angles: unless shown otherwise ± 1/2°

d Label area to be recessed: 0,25 mm. Location and size of label area at the discretion of the manufacturer.

e The film path angle shall radiate from point X.

f Draft: 1° max. per side – the dimensions shown include draft.

g A finger grip shall be provided at side A – equally about the horizontal centre-line and similar to that shown.

**Figure 2 — Cartridge (enclosed type) for 16 mm processed microfilm**

# 5 Requirements for reel and film

## 5.1 Reel dimensions

The following requirements pertain to the reel itself (see Figures 3 and 4) as a separate unit.

Dimensions shall be as given in Figures 3 and 4 and Tables 4 and 5.

## 5.2 Leader

The leader shall meet the following requirements.

### 5.2.1 Width

Width shall be no greater than 16 mm.

### 5.2.2 Thickness

Thickness shall be no greater than 0,20 mm.

### 5.2.3 Length

Length of the leader shall be a minimum of 700 mm in length.

The retrieval-device manufacturer's manual should be consulted prior to creating new film for these devices. See ISO 6199.

### 5.2.4 Terminators

The leader shall not have terminators for threading the film through the reader or reader-printer.

**Table 4 — Dimensions of wide reel (older design) for 16 mm microfilm (see Figure 3)**

Dimensions in millimetres

| | |
|---|---|
| *A* | 16,13 min. at core |
| *B* | 20,95 max. |
| *C* | 13,72 ± 0,13 |
| *D* | 32,26 ± 0,25 |
| *E* | 93,47 ± 0,38 |
| *F* | 1,27 ± 0,51 |
| *G* | 3,18 ± 0,38 |
| *H* | 8,13 ± 0,51 |
| *J* | 8,03 ± 0,20 |
| *K* | 29,21 ± 0,25 |
| *L* | 10,67 ± 0,13 |
| *M* | 37,46 diameter max. |
| *R* | 0,64 ± 0,13 |
| *Z* | 21,46 ± max. |

**Table 5 — Dimensions of narrow reel (future design) for 16 mm microfilm (see Figure 4)**

Dimensions in millimetres

| | |
|---|---|
| *BA* | 19,69 max. |
| *NA* | 19,18 max. |
| *PA* | 85,60 ± 0,51 |
| *QA* | 1,78 ± 0,25 |
| *SA* | 0,76 ± 0,25 |
| *TA* | 0,25 ± 0,13 |
| *A* | 16,13 min. at core |
| *C* | 13,72 ± 0,13 |
| *D* | 32,26 ± 0,25 |
| *E* | 93,47 ± 0,38 |
| *F* | 1,27 ± 0,51 |
| *G* | 3,18 ± 0,38 |
| *H* | 8,13 ± 0,51 |
| *J* | 8,03 ± 0,20 |
| *K* | 29,21 ± 0,25 |
| *L* | 10,67 ± 0,13 |
| *M* | 37,46 diameter max. |
| *R* | 0,64 ± 0,13 |
| *Z* | 21,46 max. |

## 5.3 Separate leaders

Use of separate leaders is optional. If a separate leader is used, the requirements in 5.3.1 and 5.3.2 shall apply.

### 5.3.1 Dimensions

Dimensions of width, thickness, length to first image, and shape of leading end shall meet the requirements of 5.2.

### 5.3.2 Leader-film secureness criterion

The splice used between leader and film shall be able to withstand 100 stops at a velocity of 1,5 m/s using a testing machine that exerts a tension on the film through a clutch that slips at 0,23 N·m. Environmental conditions shall be as specified in 5.4.4.

## 5.4 Trailer

The trailer shall meet the following requirements.

### 5.4.1 Length

Length of the trailer shall be a minimum of 700 mm.

The retrieval-device manufacturer's manual should be consulted prior to creating new film for these devices. See ISO 6199.

### 5.4.2 Affixing film to the core

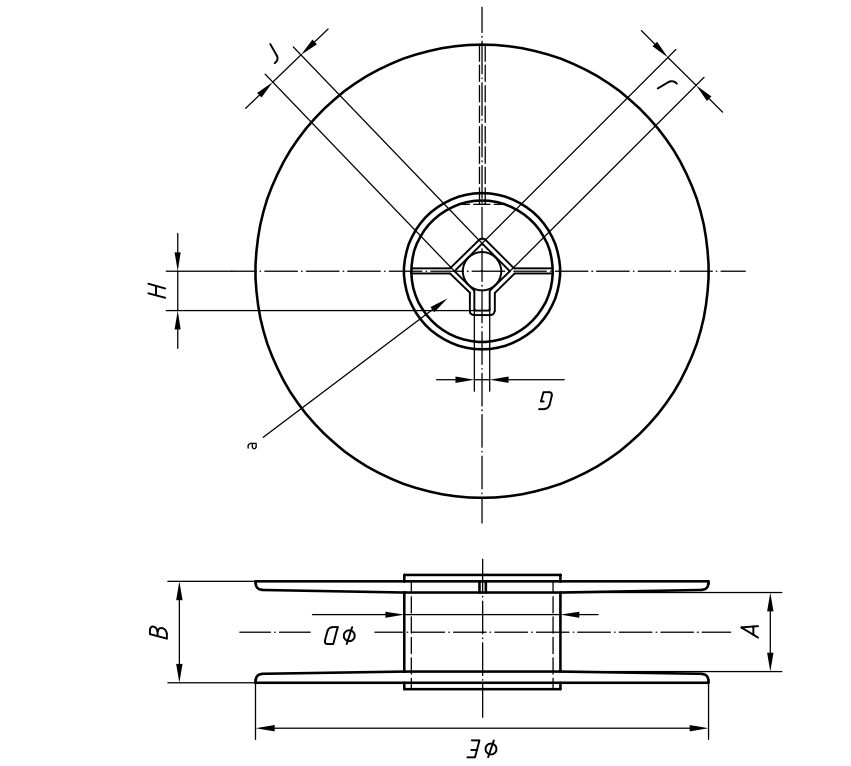
A means to securely fasten the trailer to the core of the reel shall be provided.

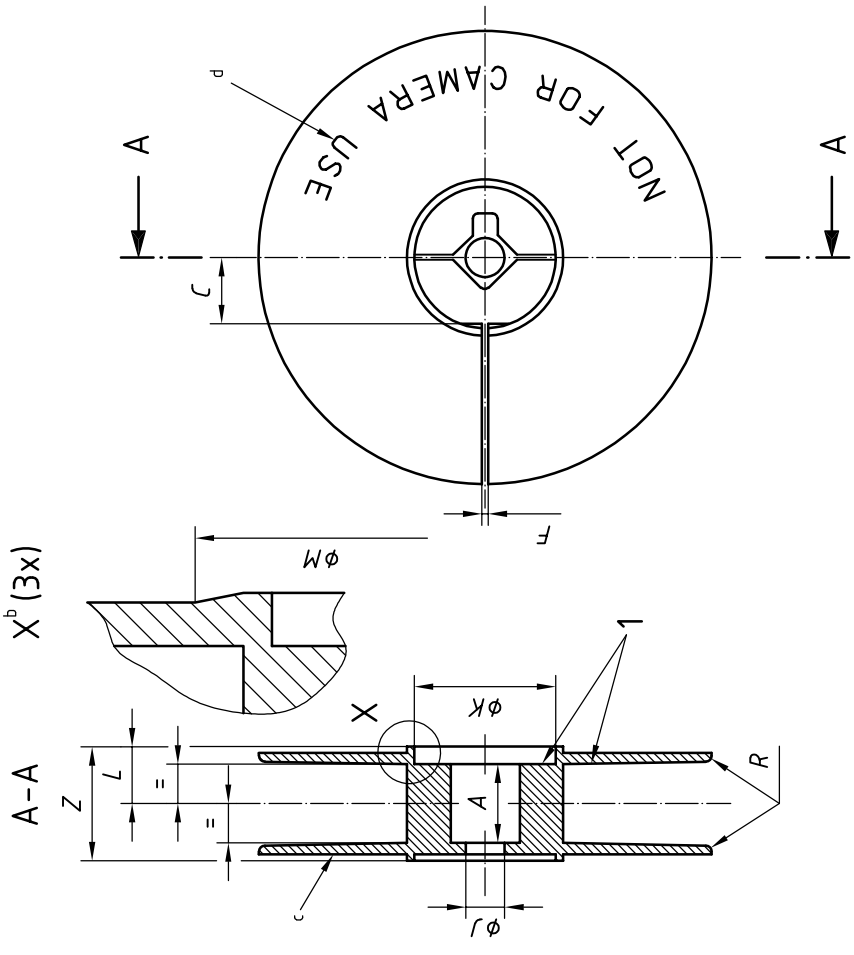
### 5.4.3 Core-film secureness criteria

The fastening method used shall be able to withstand 100 stops at a velocity of 1,5 m/s using a testing machine that exerts a tension on the film through a clutch that slips at 0,23 N·m. Environmental conditions shall be as specified in 5.4.4.

### 5.4.4 Test conditions

Testing to determine compliance with secureness criteria shall be done under the following conditions: (50 ± 5) % relative humidity; 23 °C ± 2 °C. Samples shall be conditioned in the laboratory environment for 24 h before testing.



**Key**

1 coplanar within ± 25 mm (0,10 in)

NOTE 1 Reels conforming to this figure may cause operational problems when used in enclosed cartridges (Figure 2). See 4.3.3.

NOTE 2 Dimension $B$ is the total width outside the flanges, including lateral runout, lettering, and areas for labeling.

NOTE 3 The tolerance on dimension $F$ only applies between $C$ and $D$ dimensions.

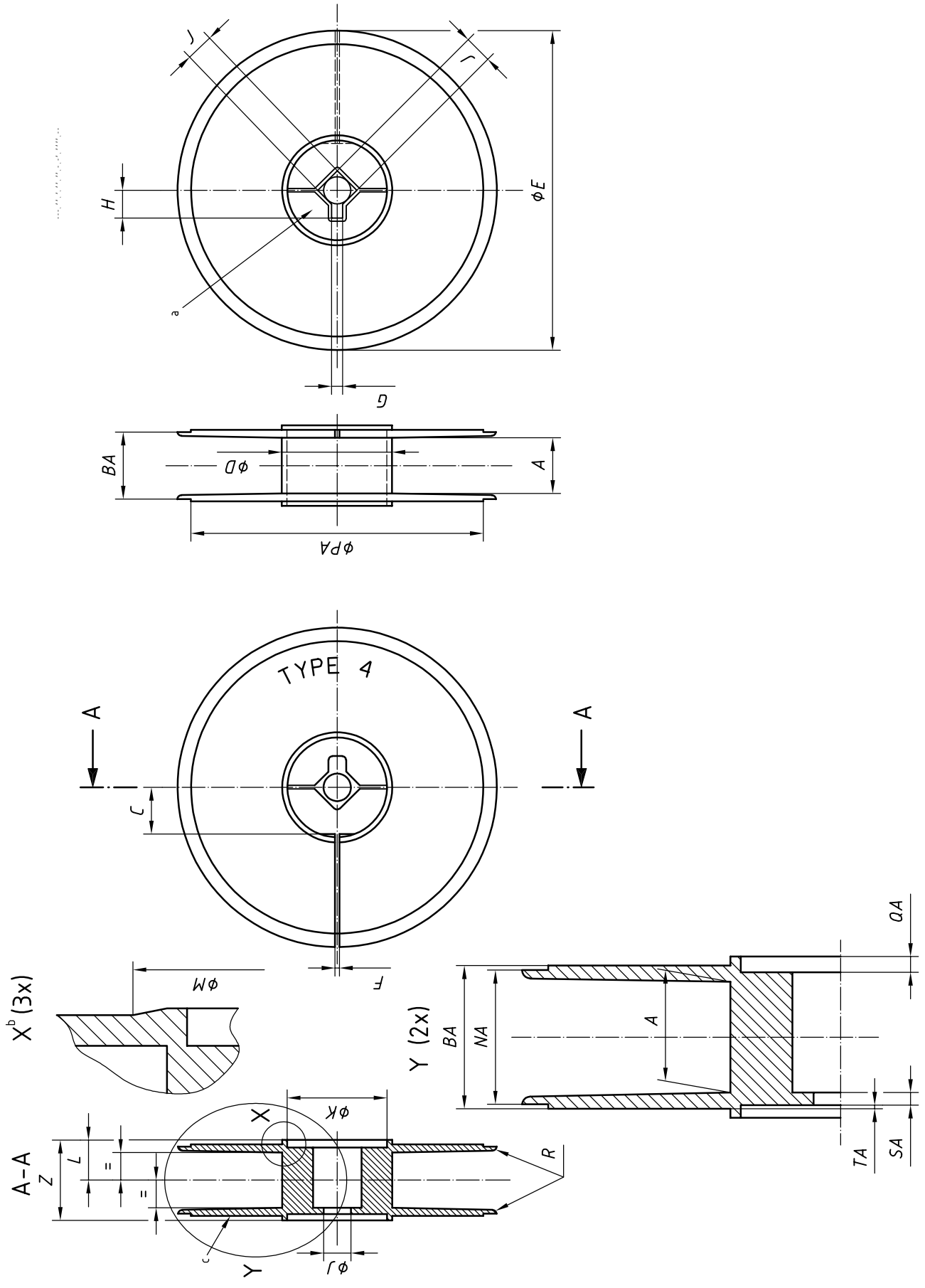
a Supporting web and wall sections within $K$ diameter at the discretion of the manufacturer.

b Fillet angle is optional.

c See 5.6.1.

d Optional inclusion — “NOT FOR CAMERA USE”.

**Figure 3 — Wide reel (older design) for processed 16 mm microfilm**



NOTE 1 Dimension $BA$ is the total width outside the flanges including lateral runout, lettering, and areas for labeling.

NOTE 2 The tolerance on dimension $F$ only applies between $C$ and $D$ dimensions.

NOTE 3 Optional inclusion — “NOT FOR CAMERA USE”

NOTE 4 Dimensions $NA$ and $PA$ provide a step in the surface of each flange to accommodate dimensions 2$S$ and 2$T$ in Figure 2.

a Supporting web and wall sections within $K$ diameter at the discretion of the manufacturer.

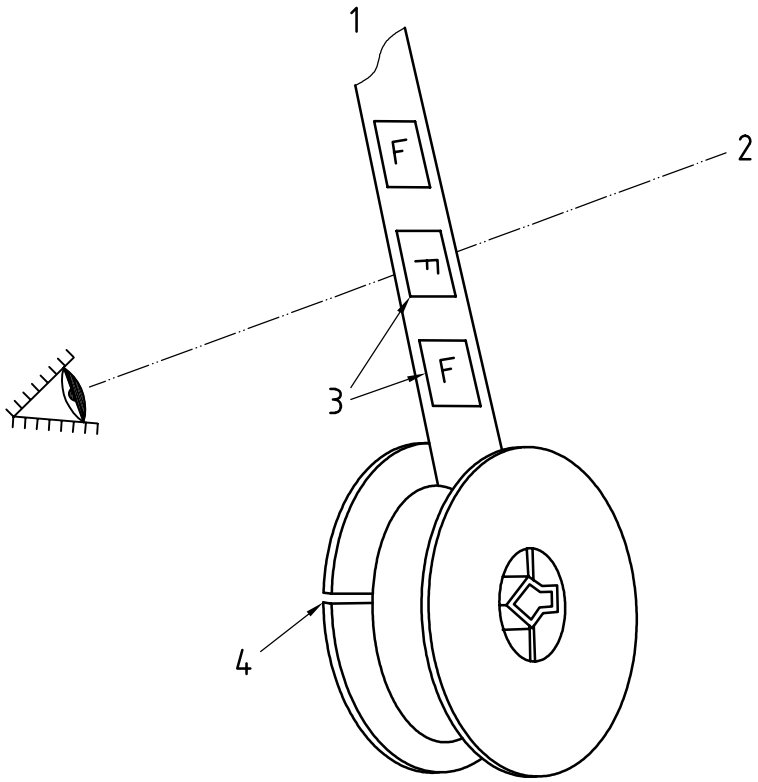
b Fillet angle is optional.

c See 5.6.1.

**Figure 4 — Narrow reel (future design) for processed 16 mm microfilm**

## 5.5 Image placement

Image placement shall be in accordance with Figure 5.




**Key**

1 leading end of film
2 light
3 right reading
4 loading slot

**Figure 5 — Image placement**

## 5.6 Materials

See Annex B.

### 5.6.1 Flexibility of flanges

It shall take not less than 71 g to 212 g to pinch the flanges of an empty reel together 2,54 mm from their free positions. The force and measurement shall be applied 3,175 mm from the periphery of the flanges. The flanges must return to their original position after the test.

### 5.6.2 Impact strength

The reel, loaded with 30,5 m of 0,130 mm thick film, shall be capable of withstanding the following test without shattering and without impairment of use: four drops from a height of 1,2 m onto a level, flat steel surface. The reel is dropped once on the edge of each flange and once on the face of each flange under the same test conditions as specified in 5.4.4.

### 5.6.3 Compatibility

All materials of the reel shall be so chosen as not to cause loss of information on the film or loss of reel function (see Annex B).

## 5.7 Maximum roll diameter

The maximum roll diameter, including leader and trailer, shall not be greater than 9 mm less than the diameter of the reel itself (see Annex A).

## 5.8 Markings

Any marking moulded in either reel, either inside or outside, shall be flush or below the surface level of the associated face.

## 5.9 Surface finishing

The inside surface finish shall be free of any flashing or moulding lines in the film path.

# Annex A
(normative)

# Reel capacity

The reels specified in Figures 3 and 4 are capable of being loaded with 30,5 m of 0,130 mm thick film or with corresponding amounts of film of another thickness. However, regardless of this capacity, the diameter of the wound film shall be as stated in 5.7 to guard against interference in the assembled cartridge. See ISO 6148 for other film thicknesses.

For short lengths of film, core filler should be used in order to provide an increased diameter of the stored film for the purpose of facilitating extraction.

# Annex B
(informative)

# Materials

See 4.3 and 5.6. It should be noted that there are no restrictions on the choice of materials other than those imposed by 4.3 and 5.6. Customers may take advantage of materials that would serve special purposes. For example, translucent materials meeting the above-mentioned requirements may be used as an aid in checking the amount of film loaded, in preventing overloading, or for other purposes.

# Annex C
(informative)

# Leading end of film

See 5.3. Although there are no restrictions on the shape of the leading end of the film, it is evident that some degree of uniformity is desirable. A suggested practice is to cut the leading end at 90° ± 5°, with chamfers at both corners of 4 mm ± 1 mm at 45° ± 5°.

# Bibliography

[1] ISO 18911:2000, *Imaging materials — Processed safety photographic films — Storage practices*

ICS 37.080

Price based on 20 pages