SMPTE 263M-2004
Revision of
ANSI/SMPTE 263M-1996

SMPTE STANDARD

for Television Digital Recording— 1/2-in Type Magnetic Tape Cassette

1 Scope

This standard specifies dimensions for three sizes of cassettes (S, M, and L) for use with 1/2-in type magnetic tape cassette for television digital recorders (see annex B).

2 Measurements

Tests and measurements on cassette parameters shall be carried out under the following atmospheric conditions:

- Temperature (20 ± 1)°C
- Relative humidity (50 ± 2)%
- Barometric pressure 86 kPa to 106 kPa
- Stabilization time 24 hours

3 Video tape cassette

3.1 General specifications

3.1.1 The dimensions of the three different cassettes used for recording shall be in accordance with figures 1 to 21. Small- and medium-size cassettes shall utilize reels with 30-mm and 50-mm hub diameter sizes. Large-size cassettes shall use reels with a 44-mm hub diameter. Both hubs within the cassette shall be the same size.

3.1.2 General tolerances for dimensions, except those for which tolerances are otherwise specified, shall be as indicated in table 1.

3.1.3 The three sizes of cassettes shall be identified as:

- Small: S
- Medium: M
- Large: L

3.1.4 Tape length, thickness, and play times for the three cassette sizes shall be as given in table 2.

3.1.5 The magnetic coating on the tape shall face out of the cassette as specified in figures 1 to 3.

Approved
February 3, 2004

Table 1 – Mechanical tolerances

Over	To	Tolerance mm
0	4	± 0.15
4	16	± 0.2
16	63	± 0.25
63	250	± 0.3
250		± 0.4

Table 2 – Tape thickness, length of tape in S, M, and L cassettes

Tape cassette	Hub diameter mm	Thickness µm	Length m
S	30	11/14	325/254
	50	11/14	204/163
M	30	11/14	632/481
	50	11/14	506/405
L	44	11/14	1237/935

3.2 Datum planes

3.2.1 Datum plane Z is determined by datum areas A, B, and C as specified in figures 4 to 6.

3.2.2 Datum area C need not correspond with a fastener.

3.2.3 Datum plane X shall be orthogonal to datum plane Z and shall run through the center of datum hole (a) and datum hole (b) as specified in figures 7 to 9.

3.2.4 Datum plane Y shall be orthogonal to both datum plane X and datum plane Z and shall run through the center of datum hole (a) as specified in figures 7 to 9.

3.2.5 The light path shall be as specified in figures 10 to 12.

3.2.6 The cassette positioning surface shall be as specified in figures 13 to 15.

3.3 Window and labels

3.3.1 Window and label areas shall be as specified in figures 16 to 18.

3.3.2 Labels attached to the cassette shall not extend beyond the external dimensions as shown in figures 16 to 18.

3.3.3 Labels shall not interfere with the identification holes of the users or the manufacturers.

3.3.4 Labels shall not interfere with the hub drive and support mechanism.

3.4 Identification holes

3.4.1 There shall be two sets of identification holes; one for the use of the manufacturer, and the other for the user.

3.4.2 The dimensions and location of manufacturers' coding holes, detailed in figures 19 to 21, shall be defined as follows:

Holes 1, 2, and 3 shall be used in combination to indicate tape thickness and diameter of hub according to table 3.

Table 3 – Identification holes

Hole number			
(1)	(2)	(3)	
0	0	0	Class 1600, 11-µm tape, 30-mm diameter hub
0	0	1	Class 1600, 11-µm tape, 50-mm diameter hub
0	1	0	Class 1600, 14-µm tape, 30-mm diameter hub
0	1	1	Class 1600, 14-µm tape, 50-mm diameter hub
1	0	0	Class 1800, 11-µm tape, 30-mm diameter hub
1	0	1	Class 1800, 11-µm tape, 50-mm diameter hub
1	1	0	Class 1800, 14-µm tape, 30-mm diameter hum
1	1	1	Class 1800, 14-µm tape, 50-mm diameter hub

NOTES

1 A ‘‘1" in the above table indicates that the indicator tab was removed or open, which results in an undetected state by the recorder/player sensor mechanism.

2 The large cassette uses only 44-mm hub. The identification for large cassettes use only hole number (1) and (2) and the actual size of the cassette defined in figure 9

3.4.3 The dimensions and location of the users' coding holes, detailed in figures 19 to 21, shall be defined as follows:

When a ‘‘1" state exists, the user holes shall identify the following conditions:

- User hole a: total record lock out (audio/video/cue/time code/control track);
- User hole b: video and control track record lock out;
- User hole c: reserved and undefined.[1)]

  ([1)] May also be used to indicate number of audio tracks for type D-14 and D-15 formats; see annex A.)

3.4.4 The user plug mechanism shall withstand an axial force of 0.5 N.

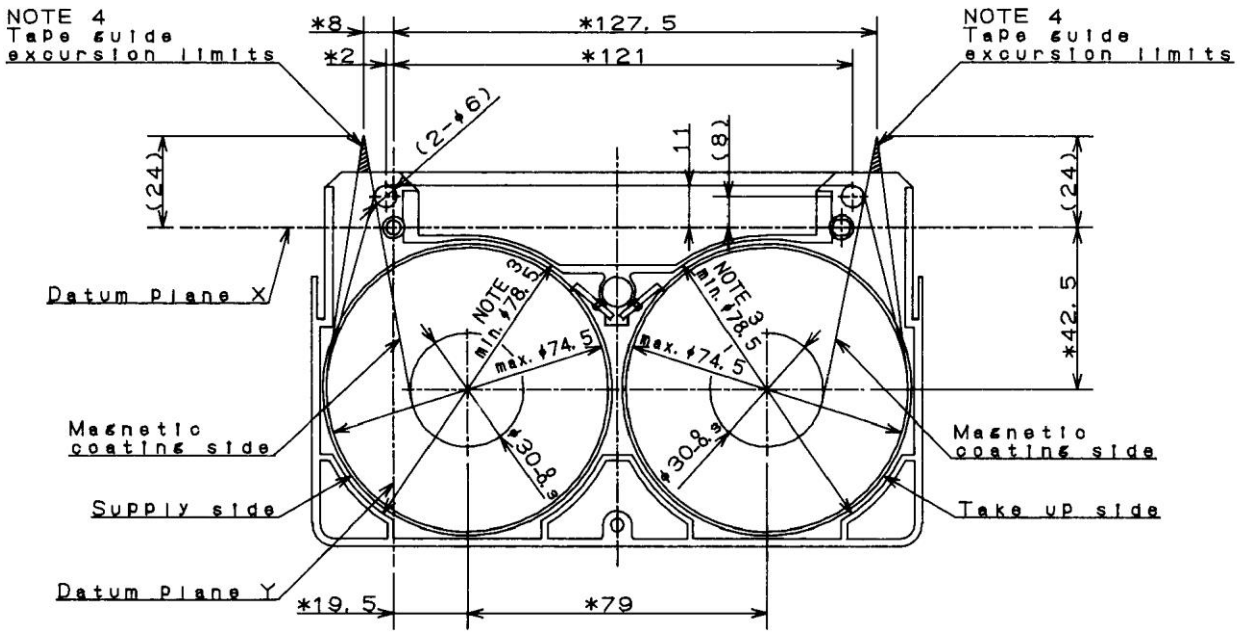
3.4.5 The color of the user plug shall be red.

3.5 Leader/trailer tape

3.5.1 The cassette shall include leader and trailer tape. When attached to the hub, the length between the splice point and the clamping point on the reel hub shall be as specified in table 4.

Table 4 – Length of leader and trailer tape

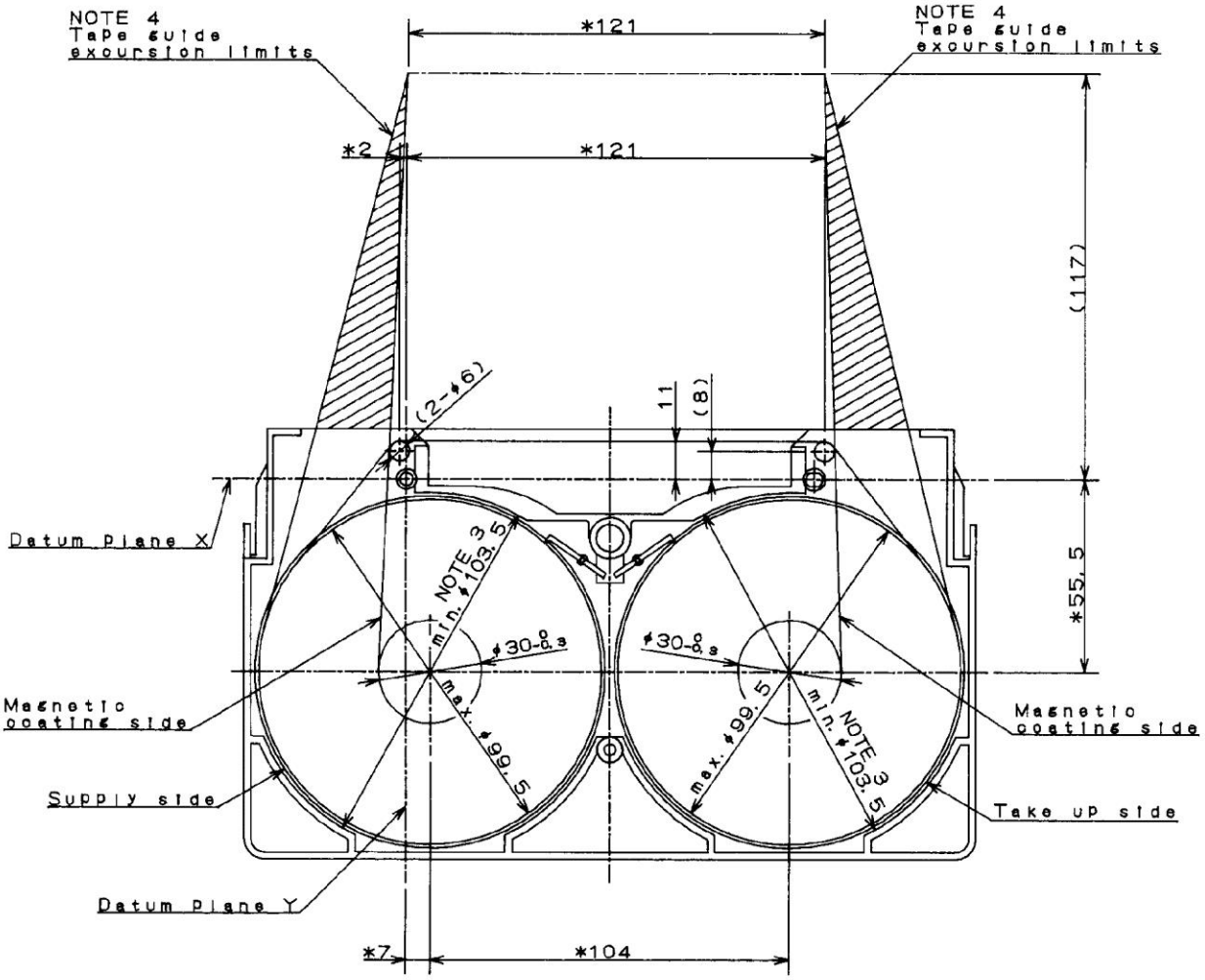
Hub diameter	Cassette size	
	S and M	L
mm	mm	mm
30	165 ± 10	—
44	—	180 ± 10
50	155 ± 10	—



Dimensions in millimeters

NOTES
1 Dimensions with an asterisk are nominal values specifying the tape path.
2 Dimensions in parentheses are for reference only.
3 Diameter specifies the minimum clearance for the reel flange.
4 The maximum excursion limits for machine tape guides ensure that there is no tape contact with cassette components.

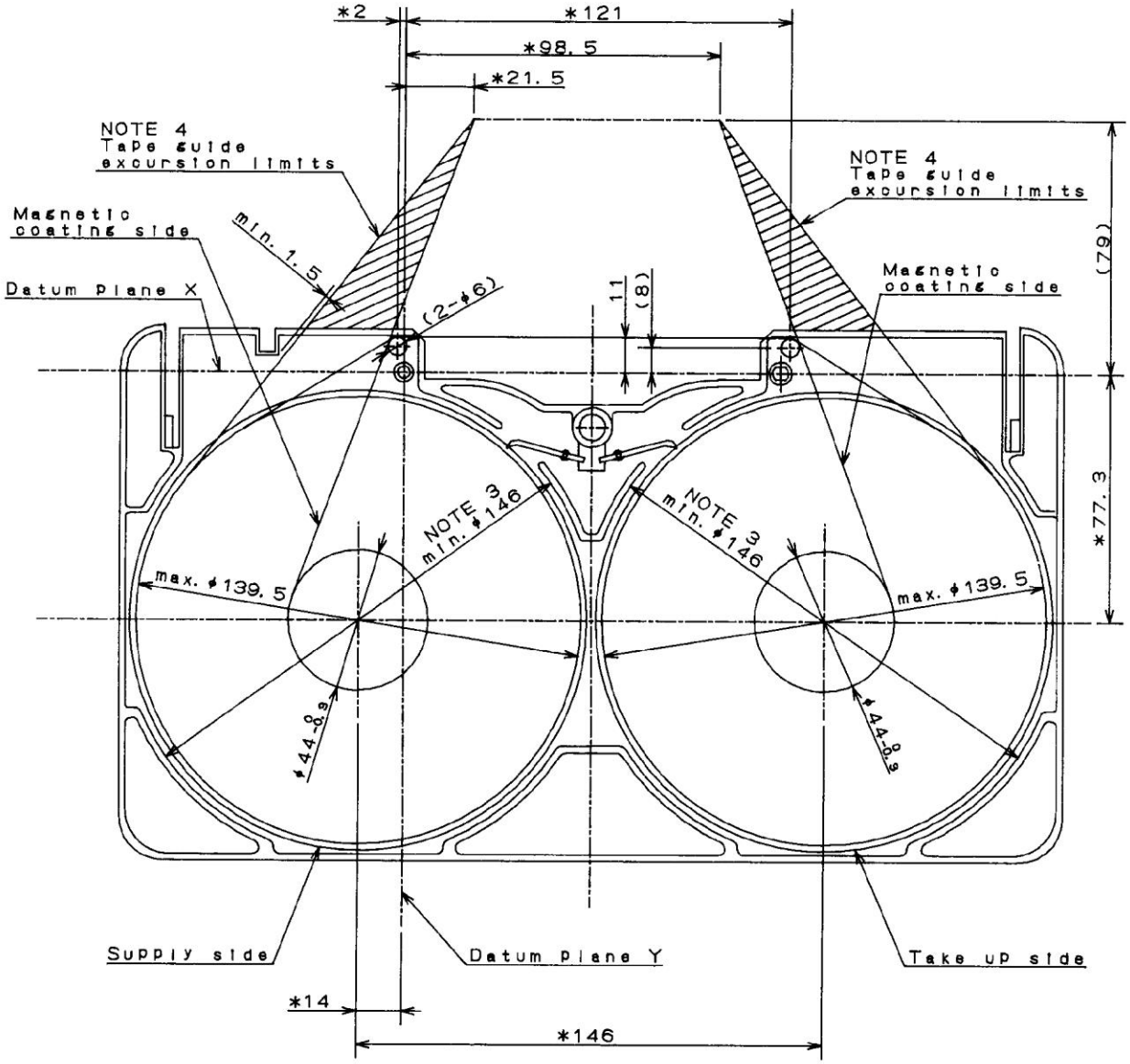
Figure 1 – Top view, inner structure and tape path of S cassette



Dimensions in millimeters

NOTES
1 Dimensions with an asterisk are nominal values specifying the tape path.
2 Dimensions in parentheses are for reference only.
3 Diameter specifies the minimum clearance for the reel flange.
4 The maximum excursion limits for machine tape guides ensure that there is no tape contact with cassette components.

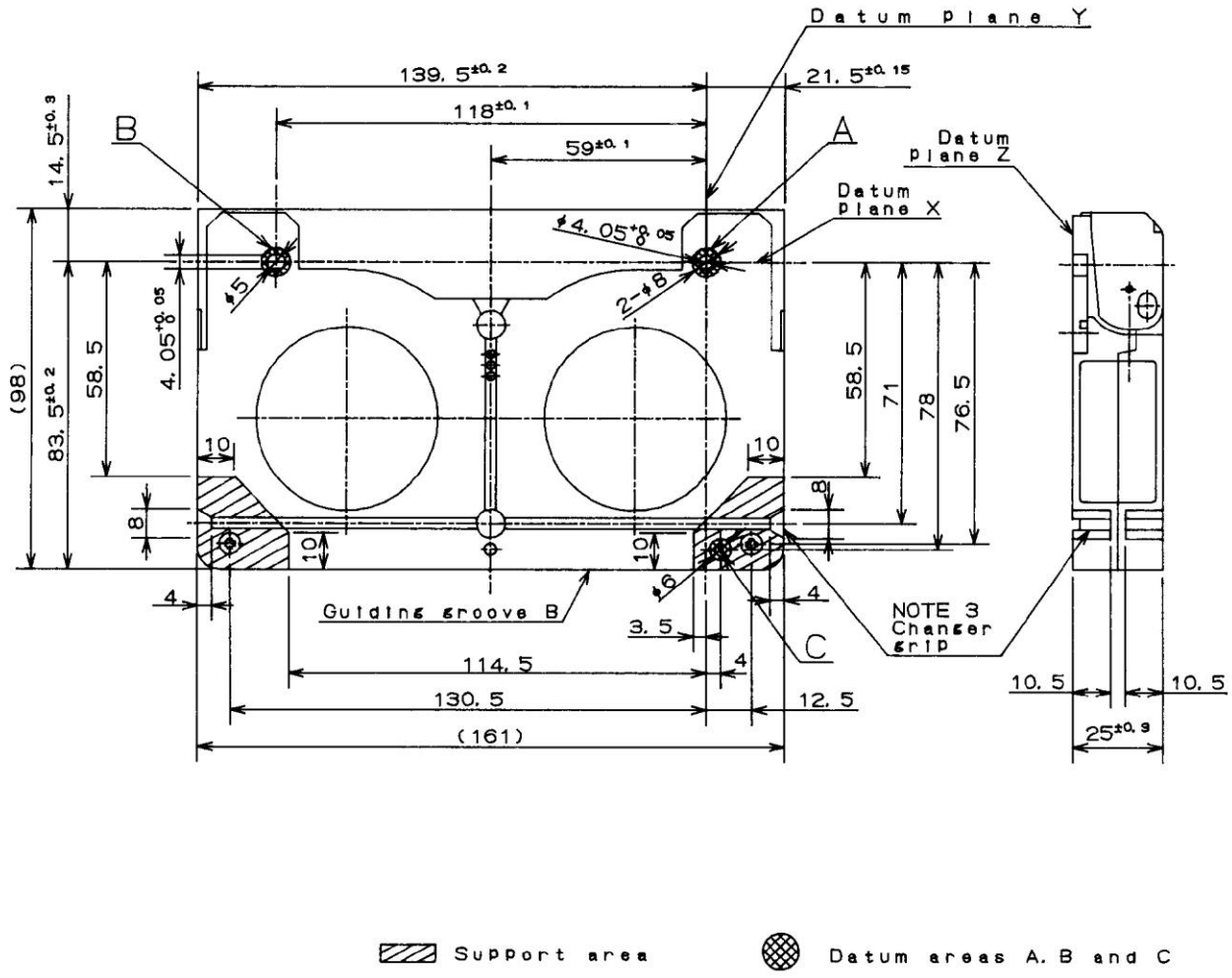
Figure 2 – Top view, inner structure and tape path of M cassette



Dimensions in millimeters

NOTES
1 Dimensions with an asterisk are nominal values specifying the tape path.
2 Dimensions in parentheses are for reference only.
3 Diameter specifies the minimum clearance for the reel flange.
4 The maximum excursion limits for machine tape guides ensure that there is no tape contact with cassette components.

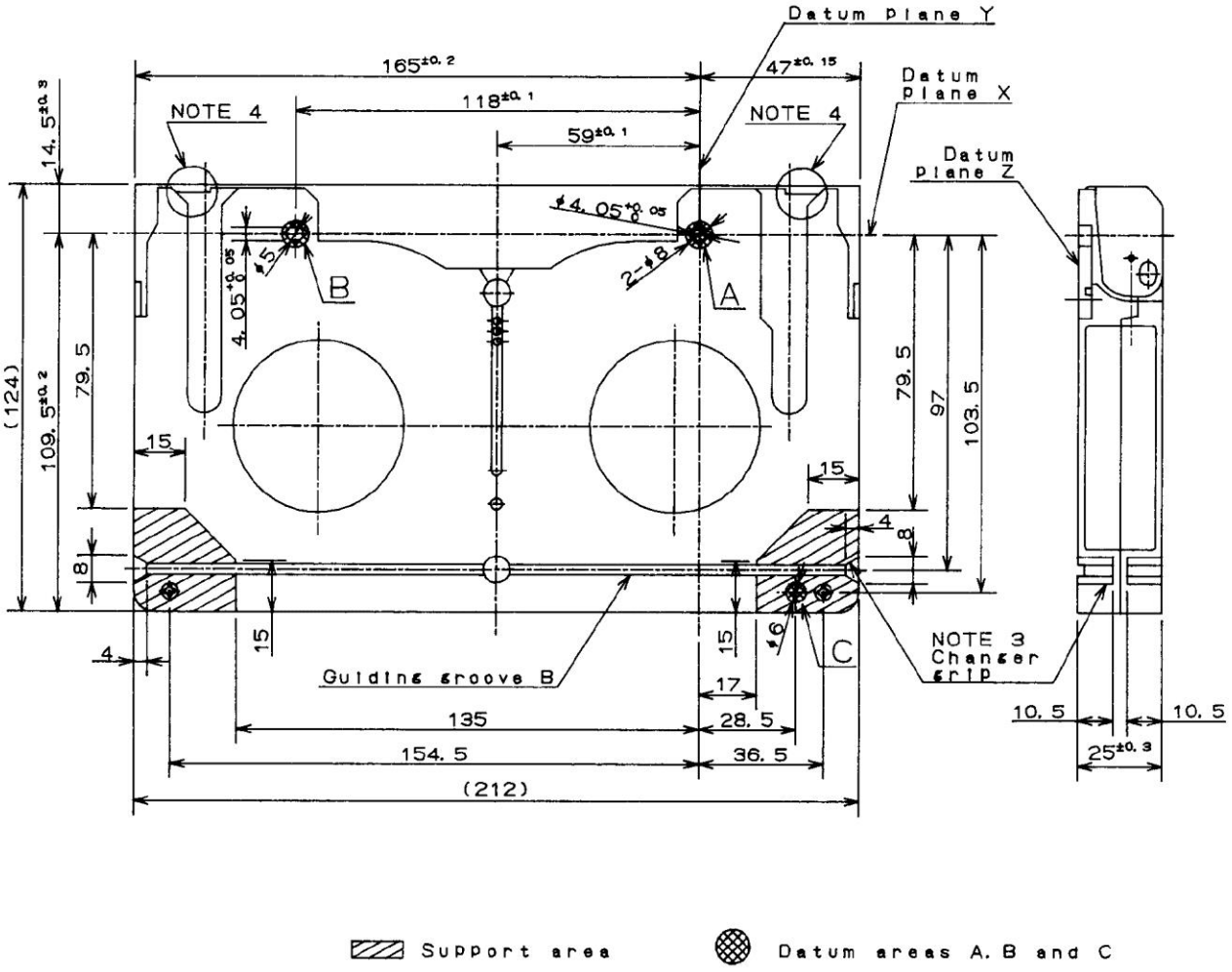
Figure 3 – Top view, inner structure and tape path of L cassette



Dimensions in millimeters

NOTES
1 The periphery within 1.0 mm from the edge of guiding groove B and from the edge of the cassette shall not be used as the support area. The cassette shall be supported by the recorder and/or player unit on the hatched area.
2 Datum plane Z shall be determined by datum areas A, B, and C.
3 Change grip for automatic changing machine.

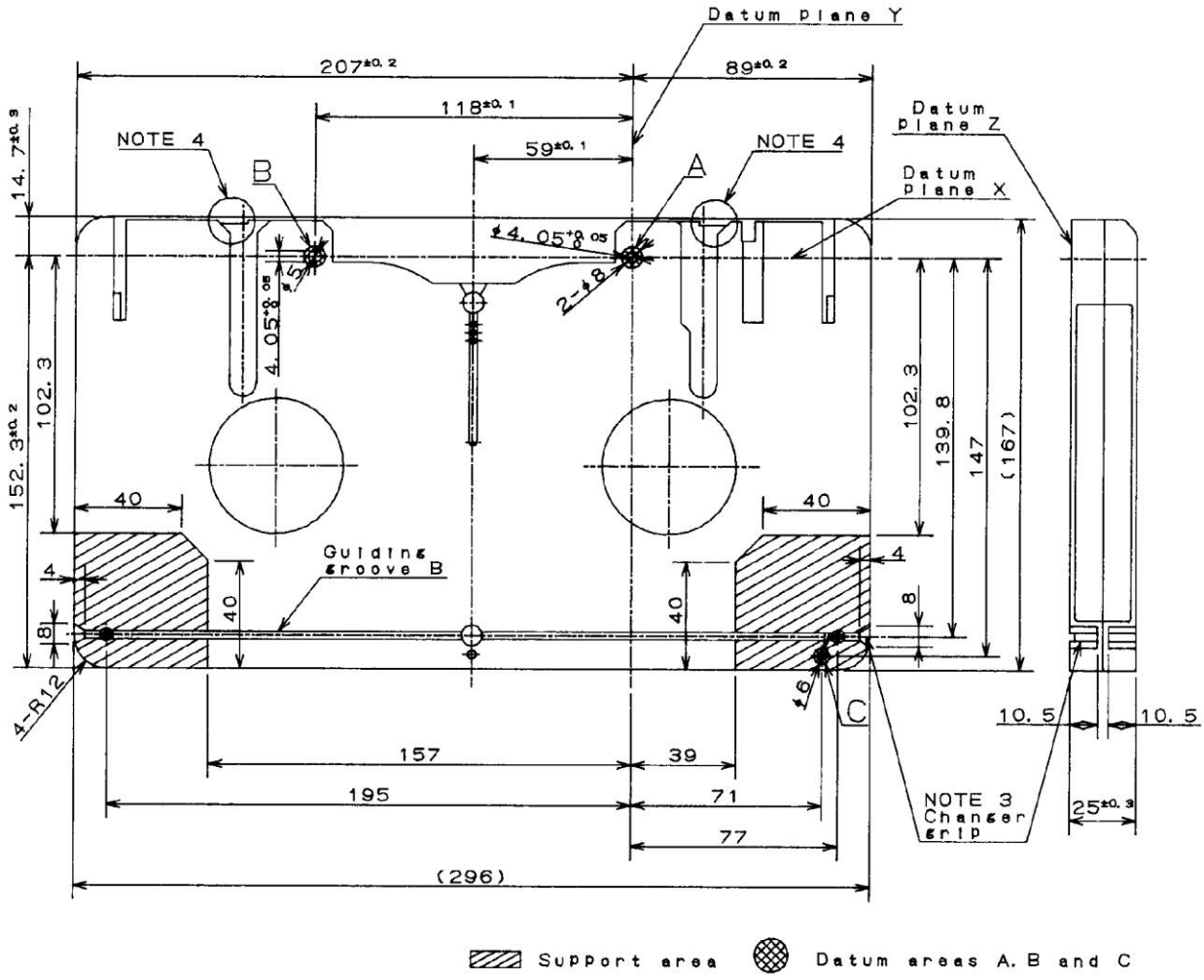
Figure 4 – Datum area, support area and change grip area of S cassette



Dimensions in millimeters

NOTES
1 The periphery within 1.0 mm from the edge of guiding groove B and from the edge of the cassette shall not be used as the support area. The cassette shall be supported by the recorder and/or player unit on the hatched area.
2 Datum plane Z shall be determined by datum areas A, B, and C.
3 Change grip for automatic changing machine.
4 “Cutout” is not mandatory.

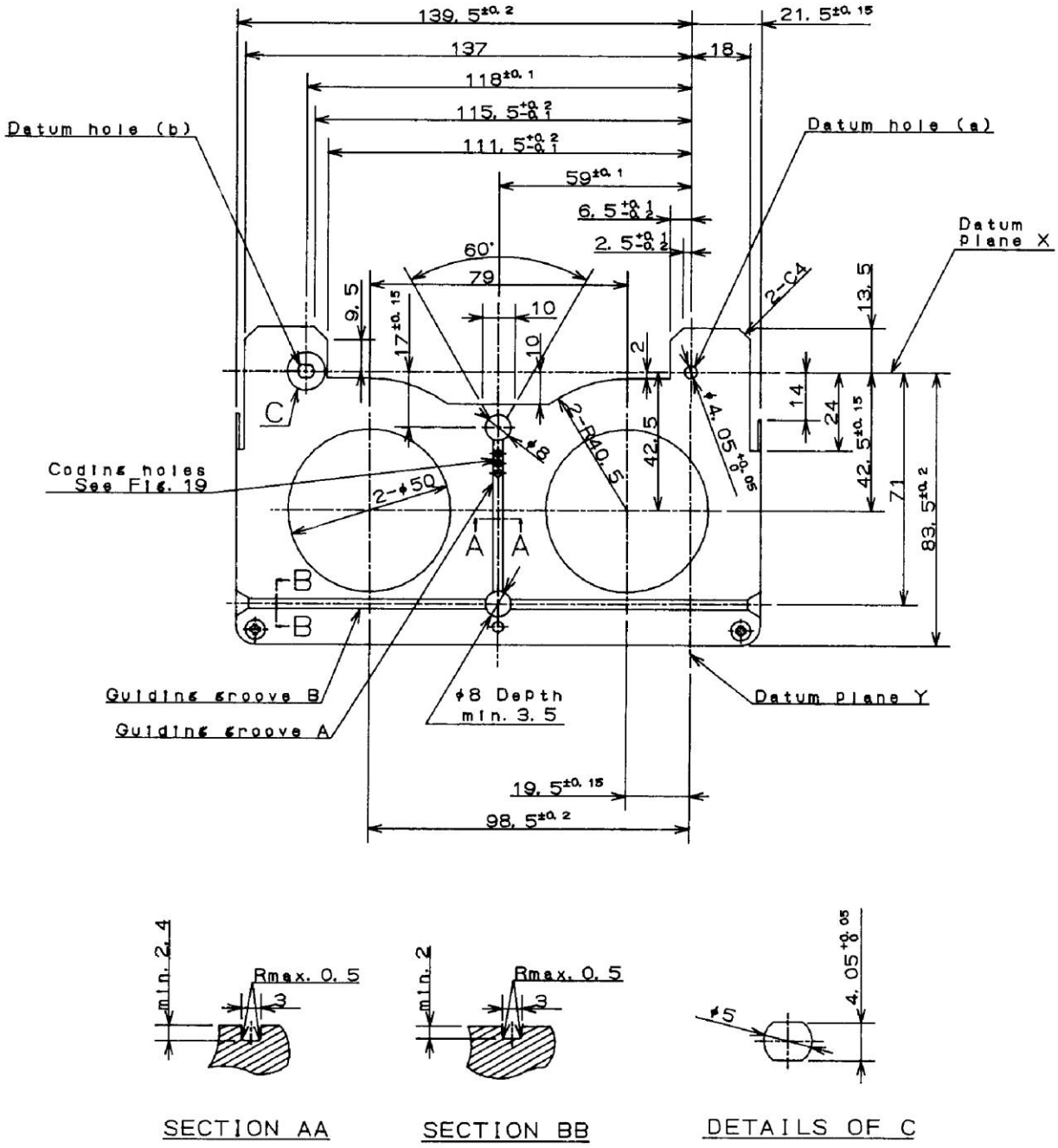
Figure 5 – Datum area, support area and change grip area of M cassette



Dimensions in millimeters

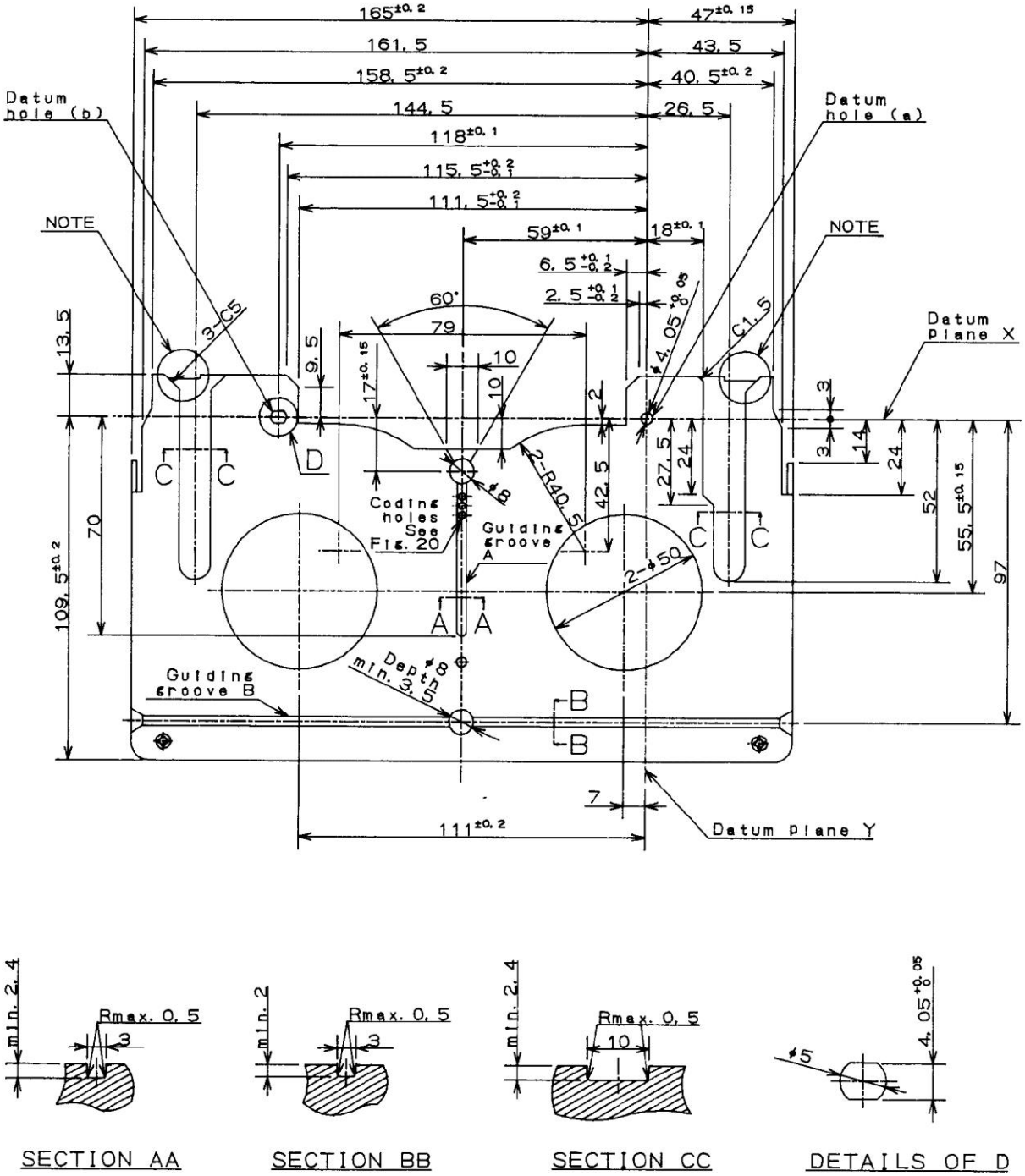
NOTES
1 The periphery within 1.0 mm from the edge of guiding groove B and from the edge of the cassette shall not be used as the support area. The cassette shall be supported by the recorder and/or player unit on the hatched area.
2 Datum plane Z shall be determined by datum areas A, B, and C.
3 Change grip for automatic changing machine.
4 “Cutout” is not mandatory.

Figure 6 – Datum area, support area and change grip area of L cassette



Dimensions in millimeters

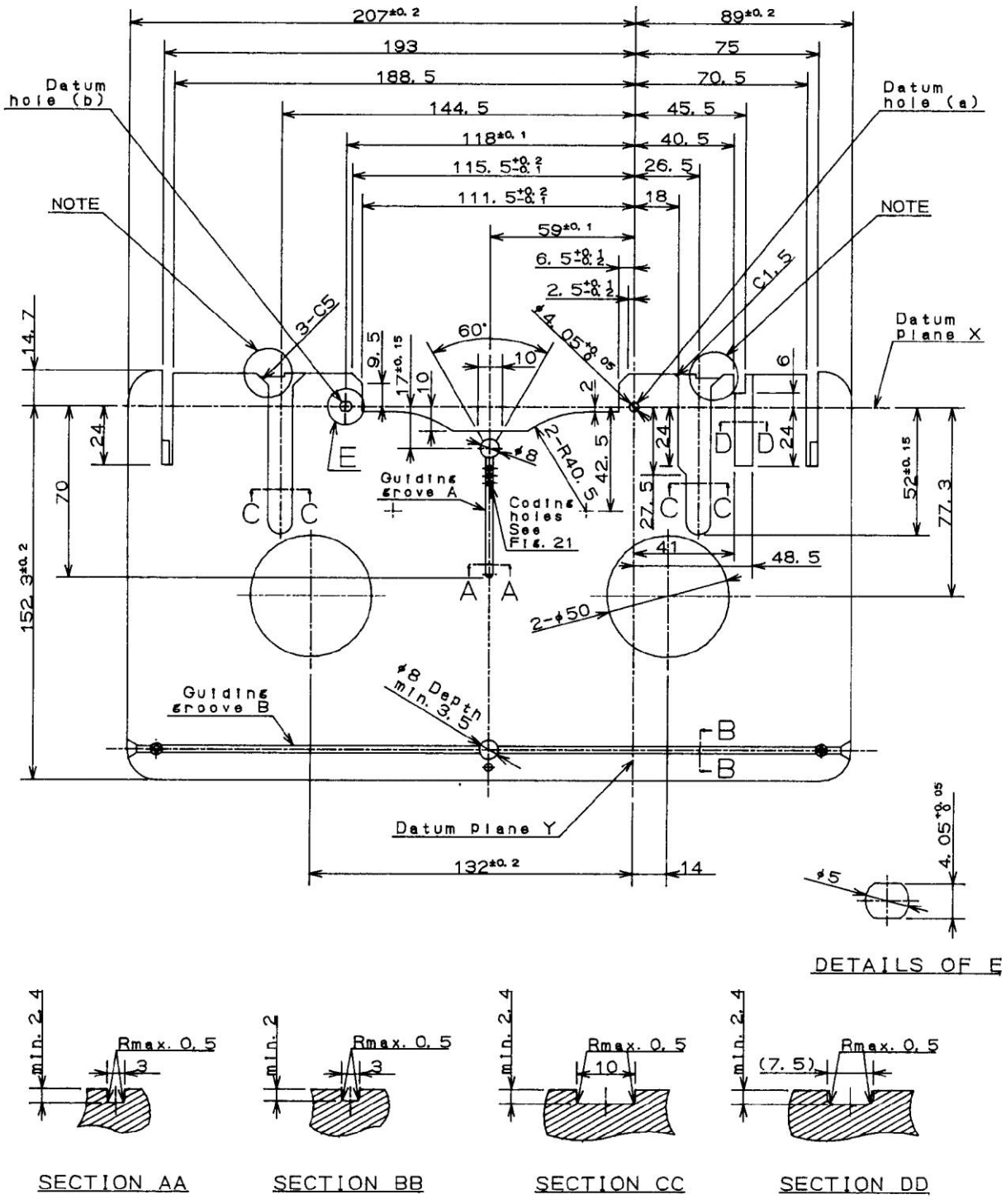
Figure 7 – Bottom view of S cassette



Dimensions in millimeters

NOTE – “Cutout” is not mandatory.

Figure 8 – Bottom view of M cassette



Dimensions in millimeters

NOTE – “Cutout” is not mandatory.

Figure 9 – Bottom view of L cassette

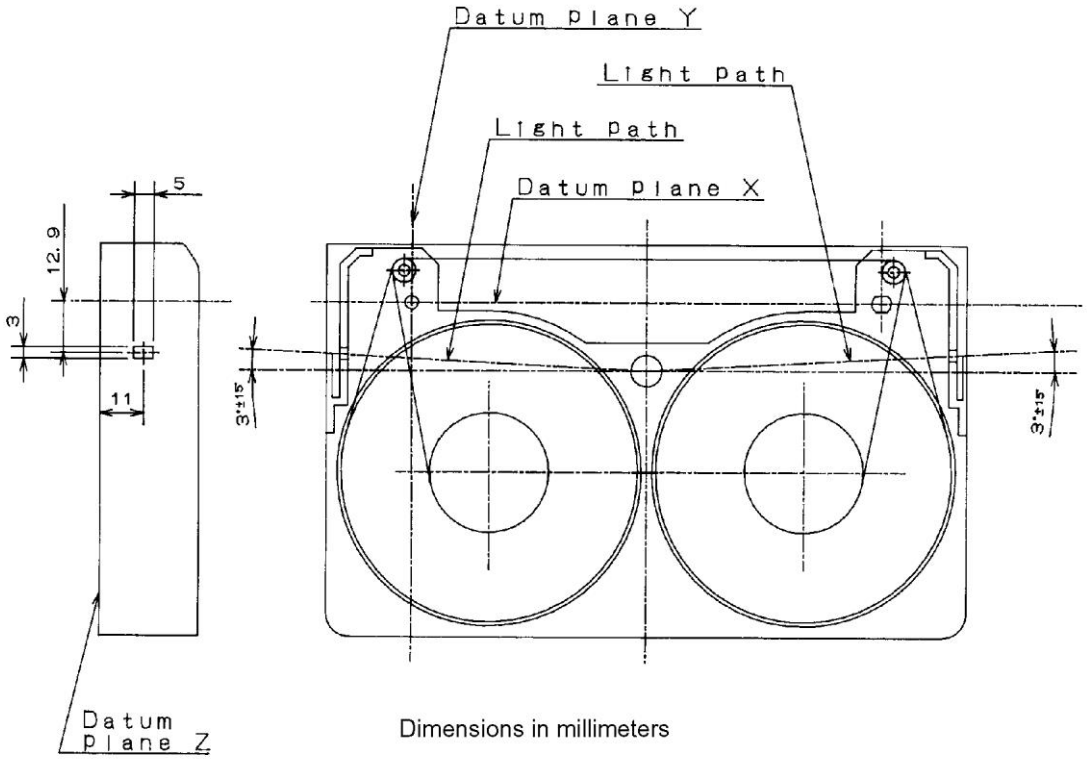


Figure 10 – Light path of S cassette

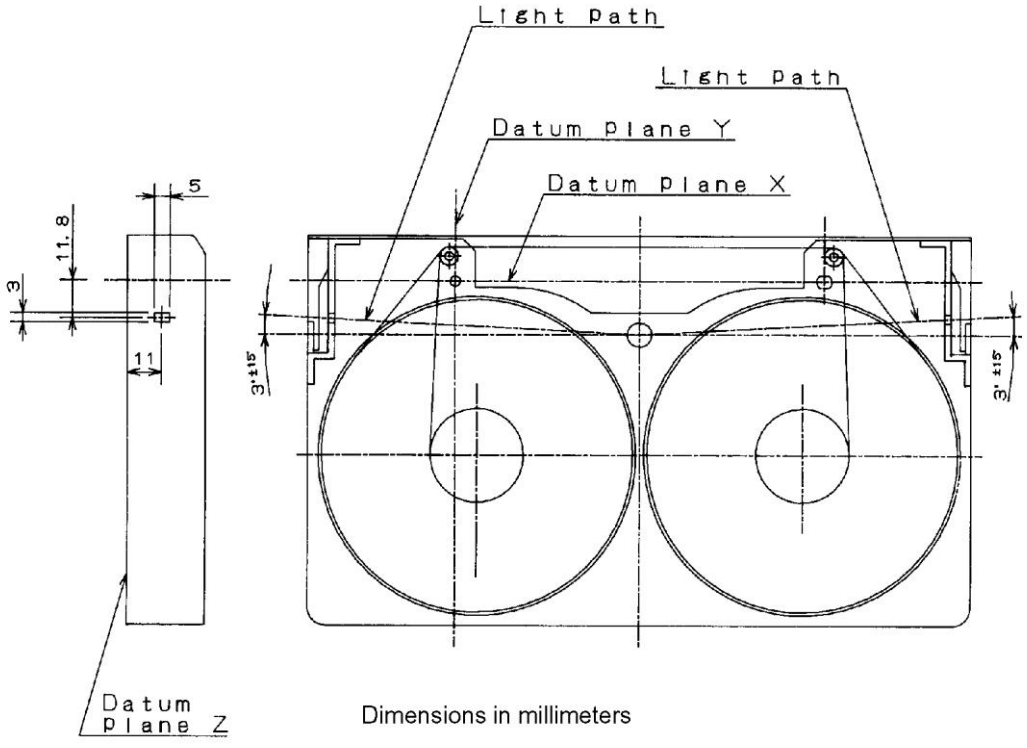


Figure 11 – Light path of M cassette

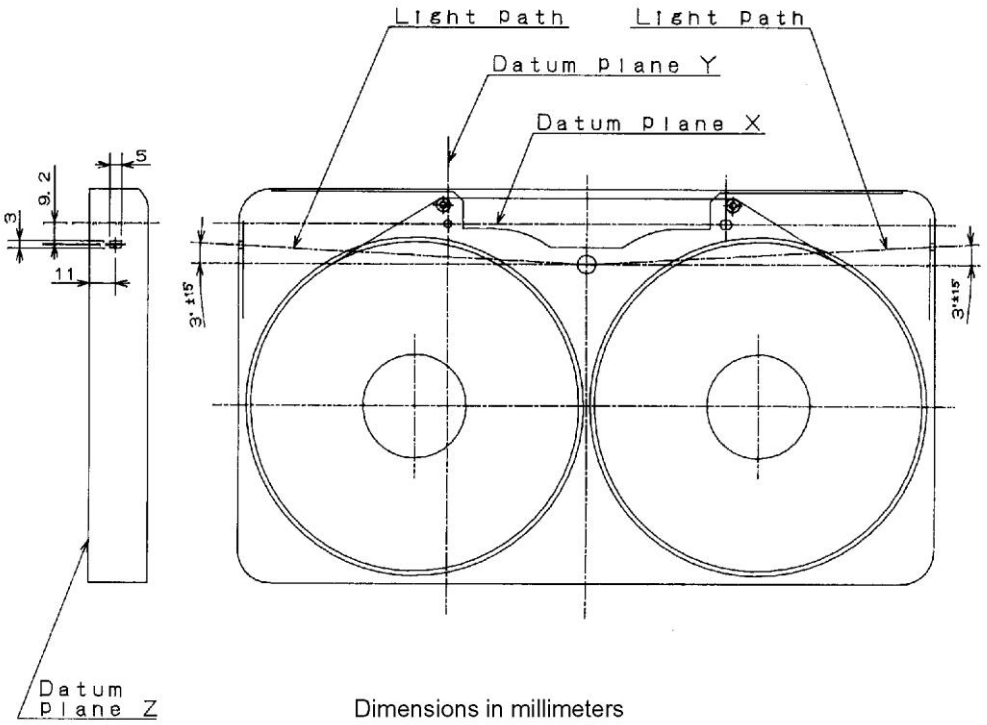
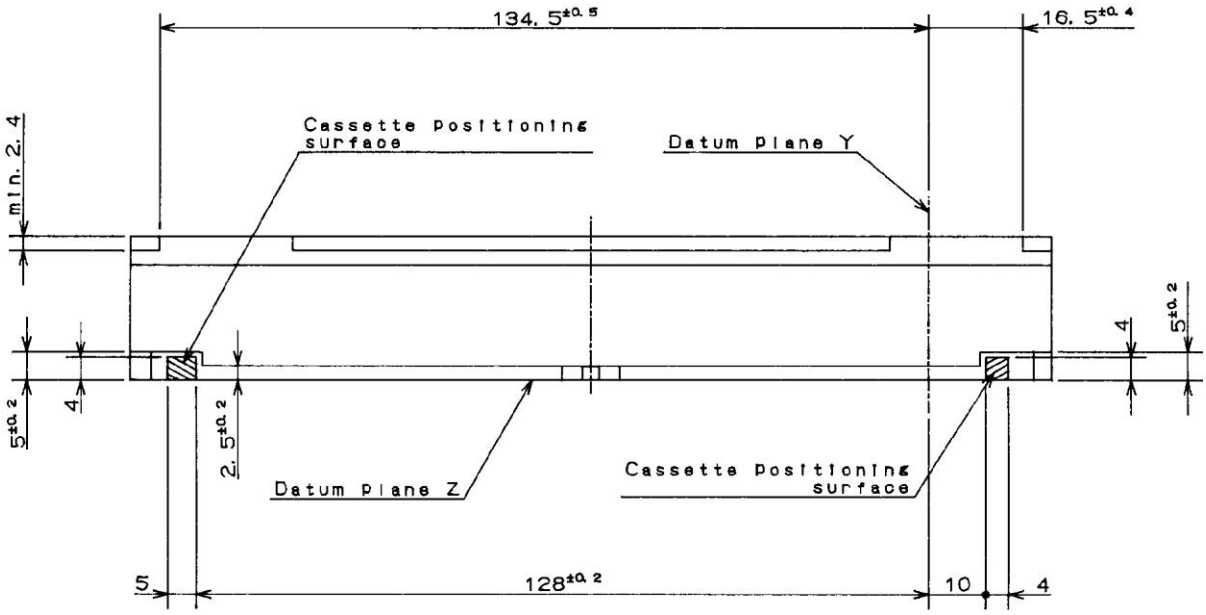
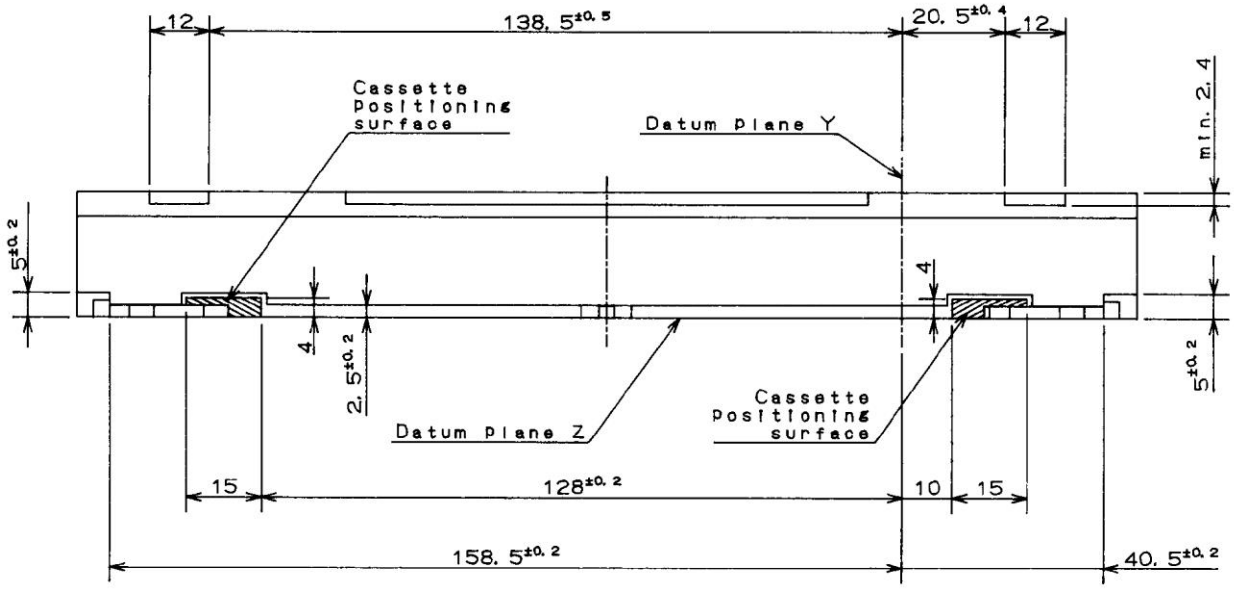


Figure 12 – Light path of L cassette



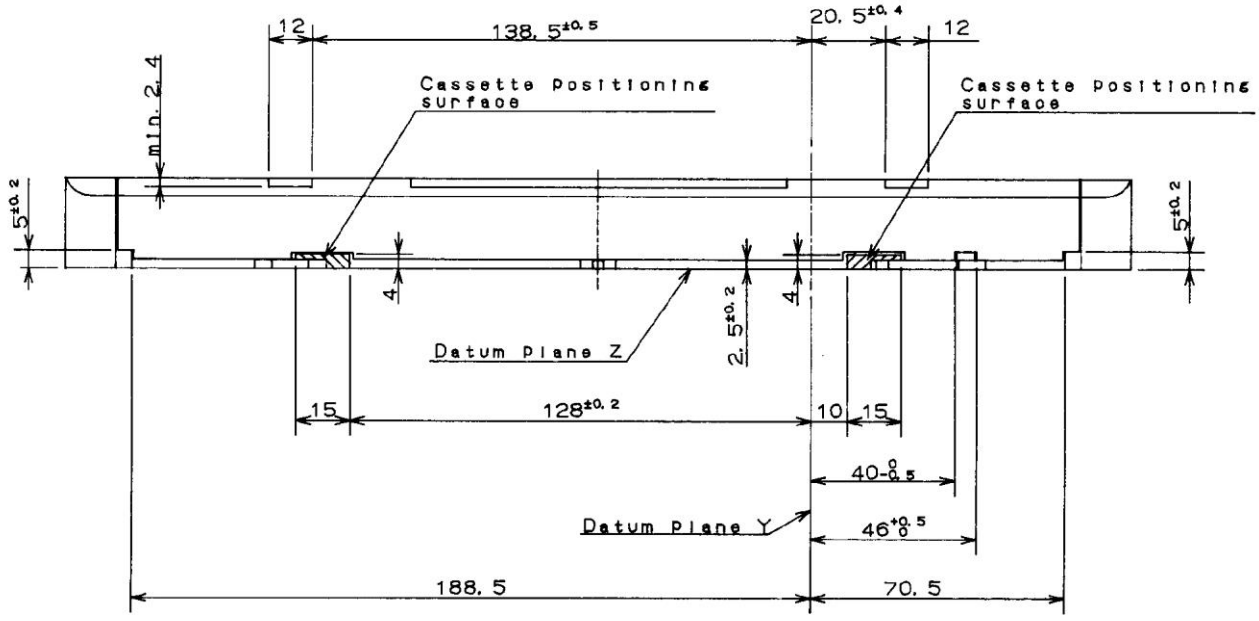
Dimensions in millimeters

Figure 13 – Cassette positioning surface of S cassette



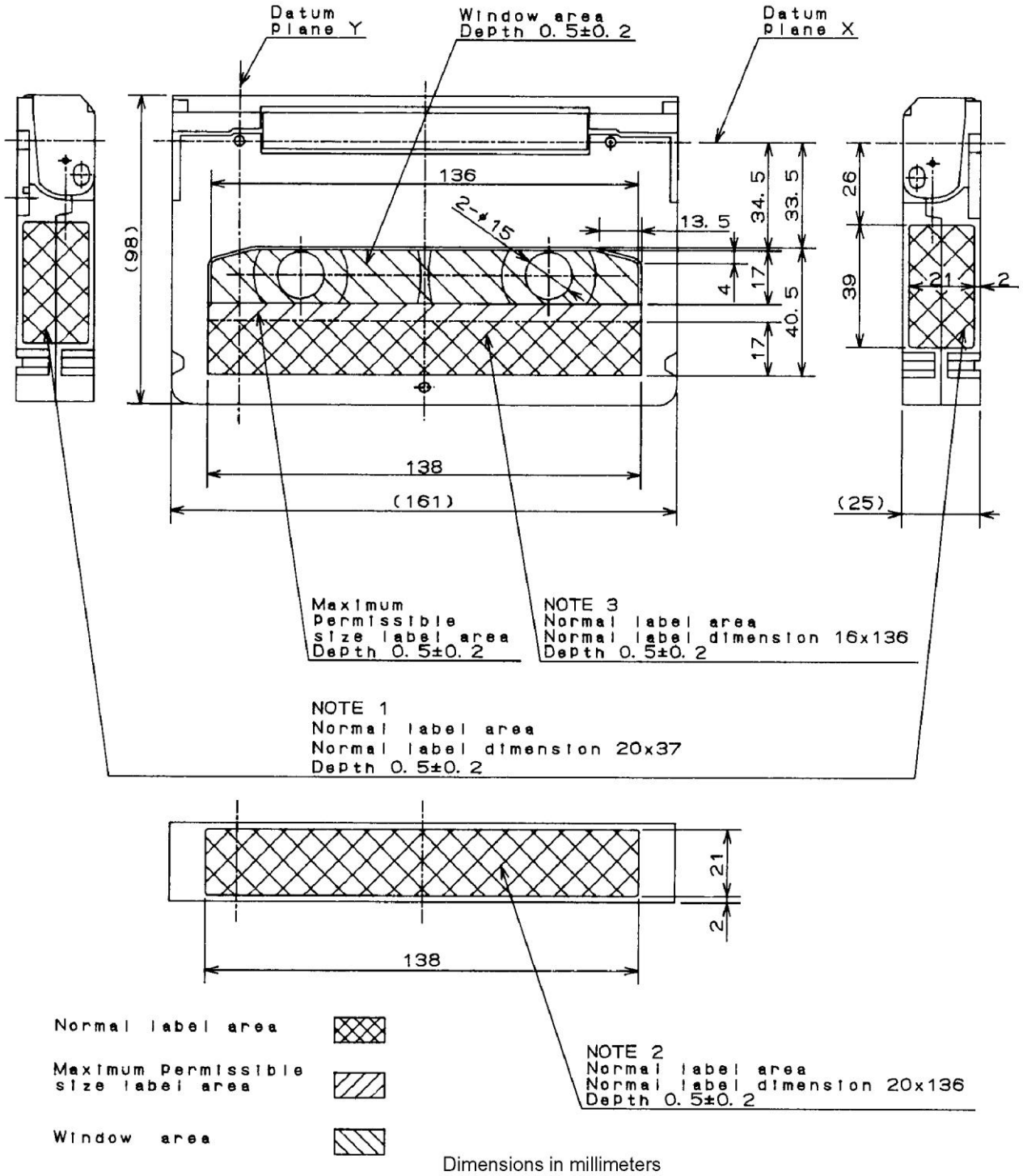
Dimensions in millimeters

Figure 14 – Cassette positioning surface of M cassette



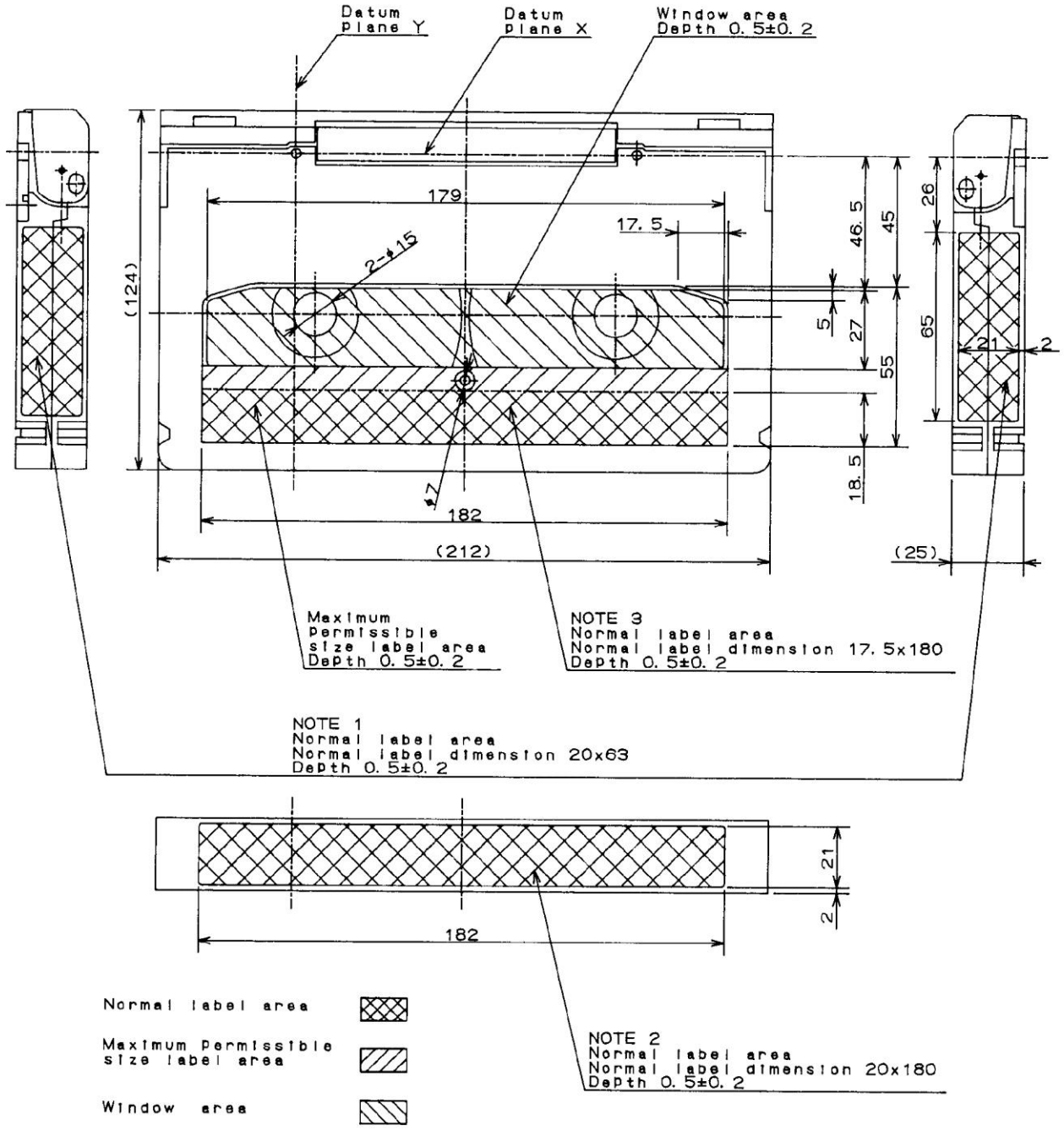
Dimensions in millimeters

Figure 15 – Cassette positioning surface of L cassette



NOTES
1 Side label may be attached to this recessed area.
2 Rear label may be attached to this recessed area.
3 Top label may be attached is this recessed area.

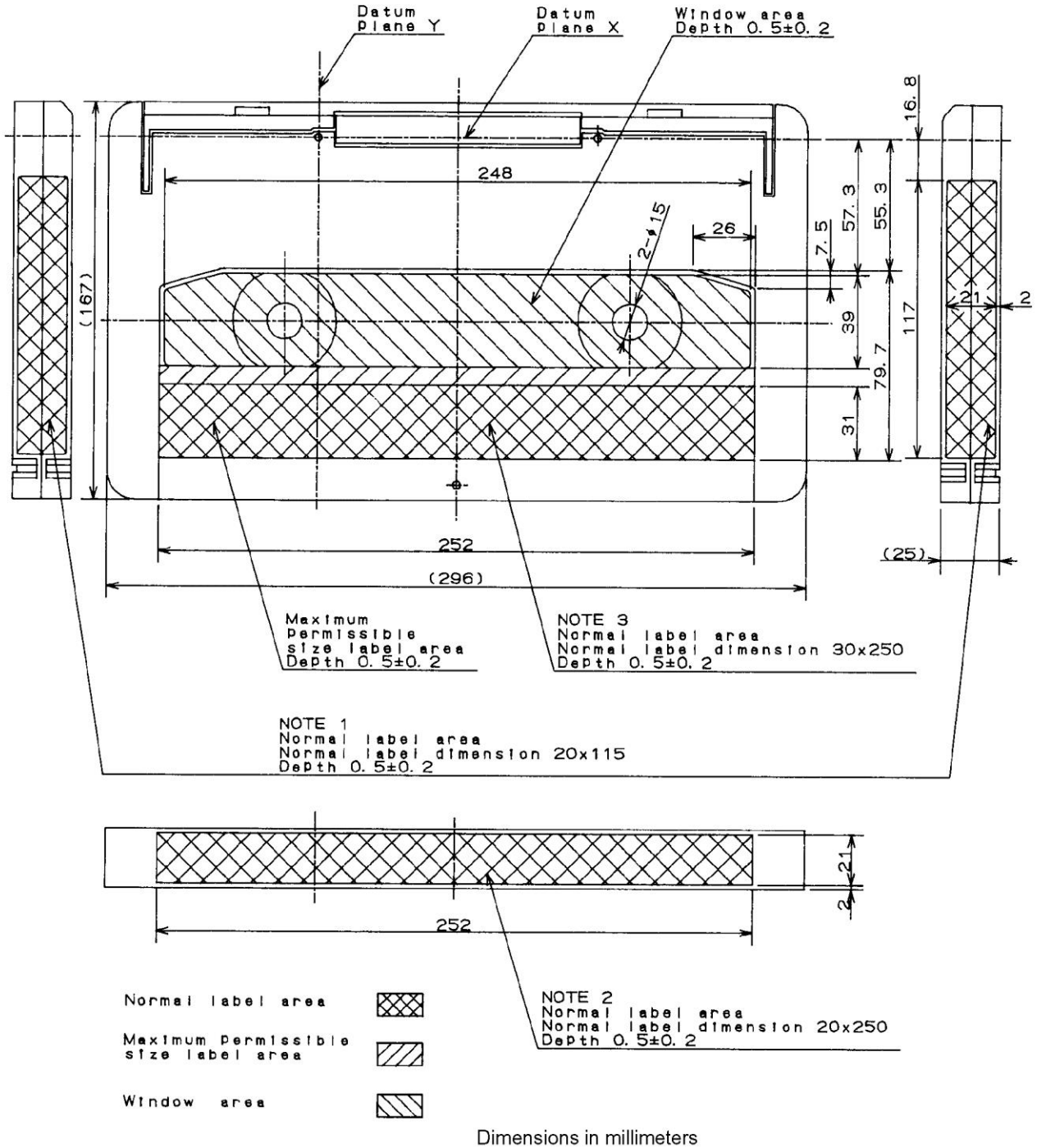
Figure 16 – Top and side views of S cassette



Dimensions in millimeters

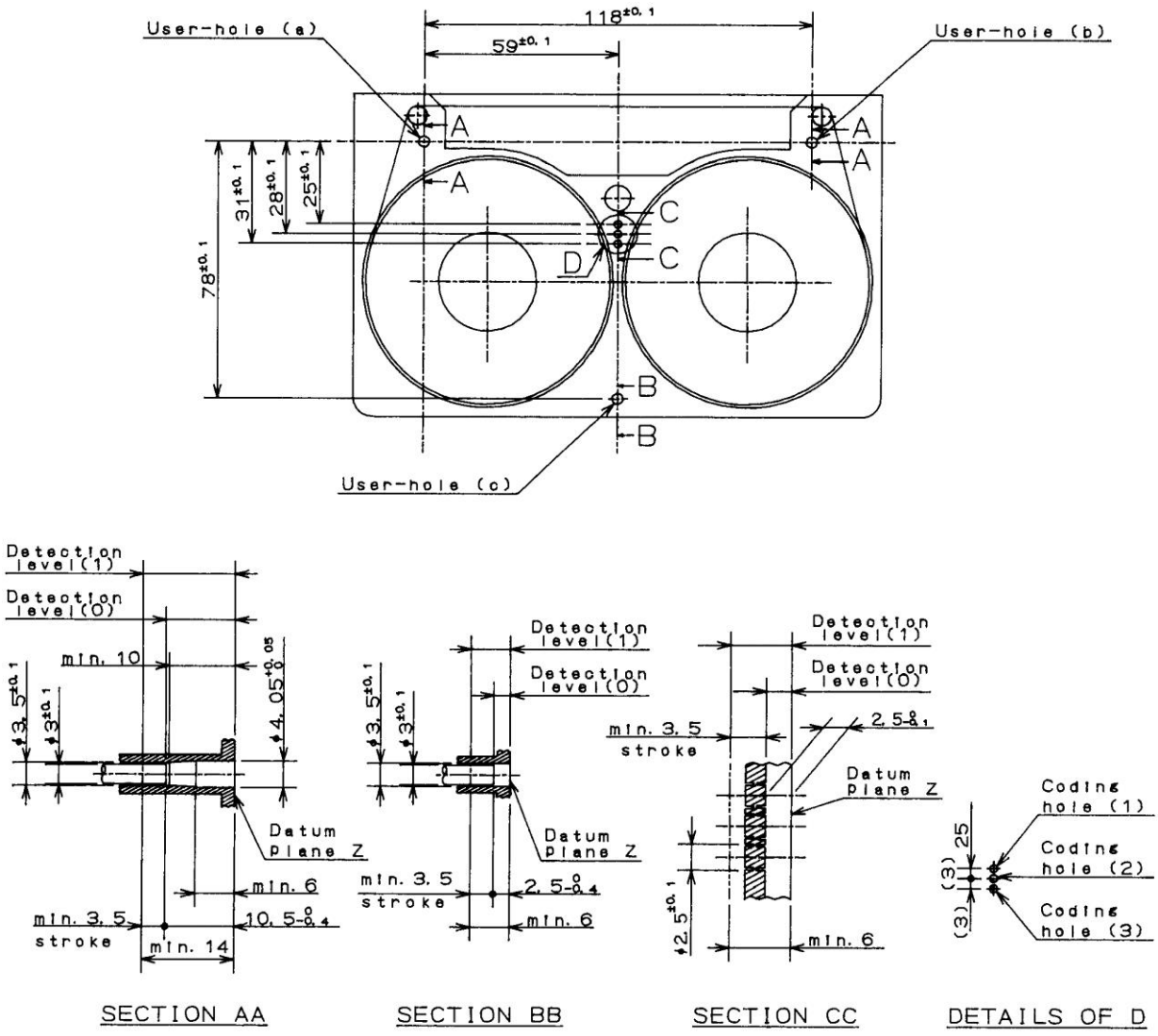
NOTES
1 Side label may be attached to this recessed area.
2 Rear label may be attached to this recessed area.
3 Top label may be attached is this recessed area.

Figure 17 – Top and side views of M cassette



NOTES
1 Side label may be attached to this recessed area.
2 Rear label may be attached to this recessed area.
3 Top label may be attached is this recessed area.

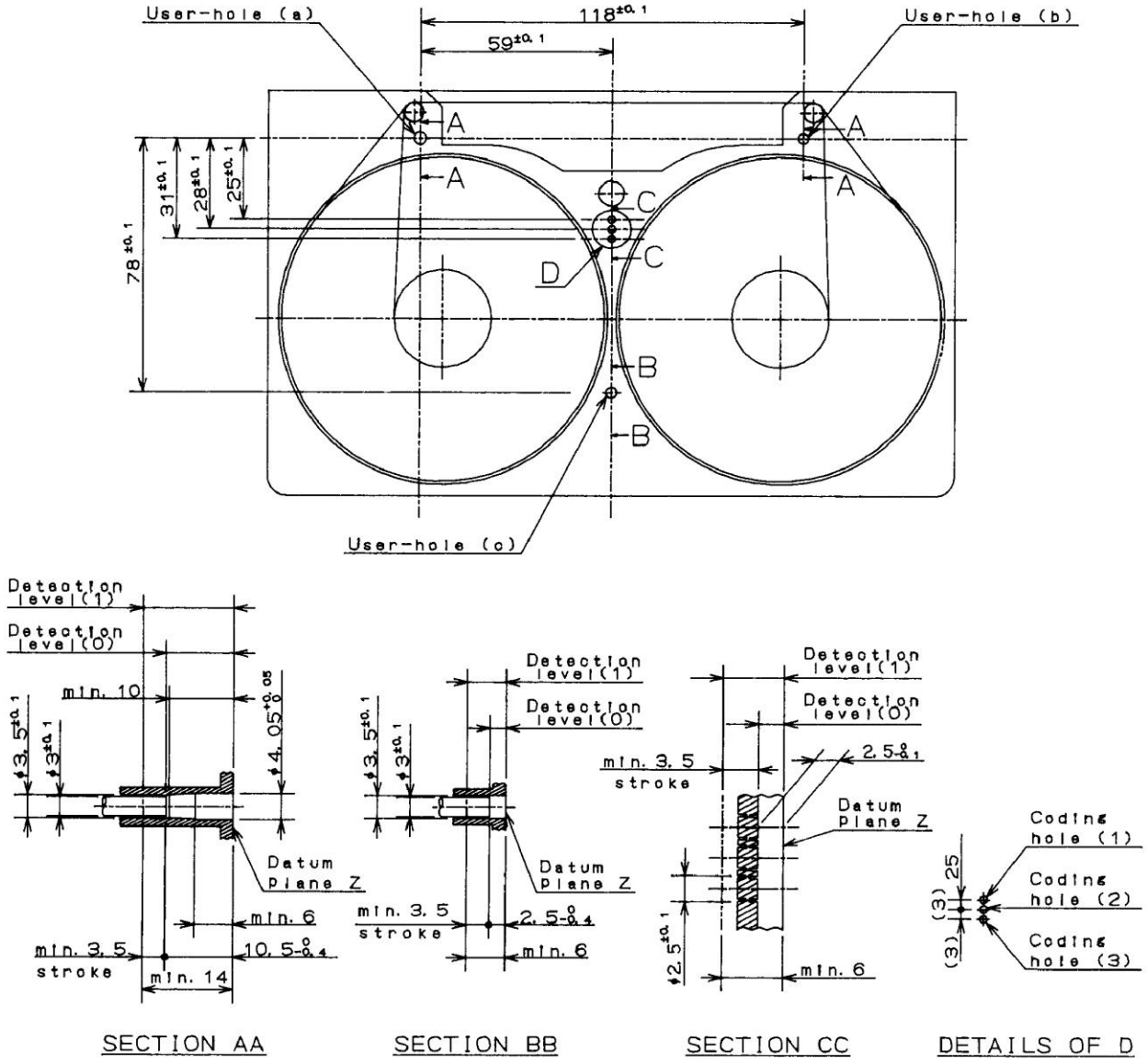
Figure 18 – Top and side views of L cassette



Dimensions in millimeters

NOTES
1 The cassette shall be provided with three coding holes (1) to (3) and three user holes (a) to (c).
2 User holes (a) to (c) on the upper shell shall be opened when user plugs are removed.
3 All cassettes shall be provided with holes as defined by sections AA, BB, and CC.

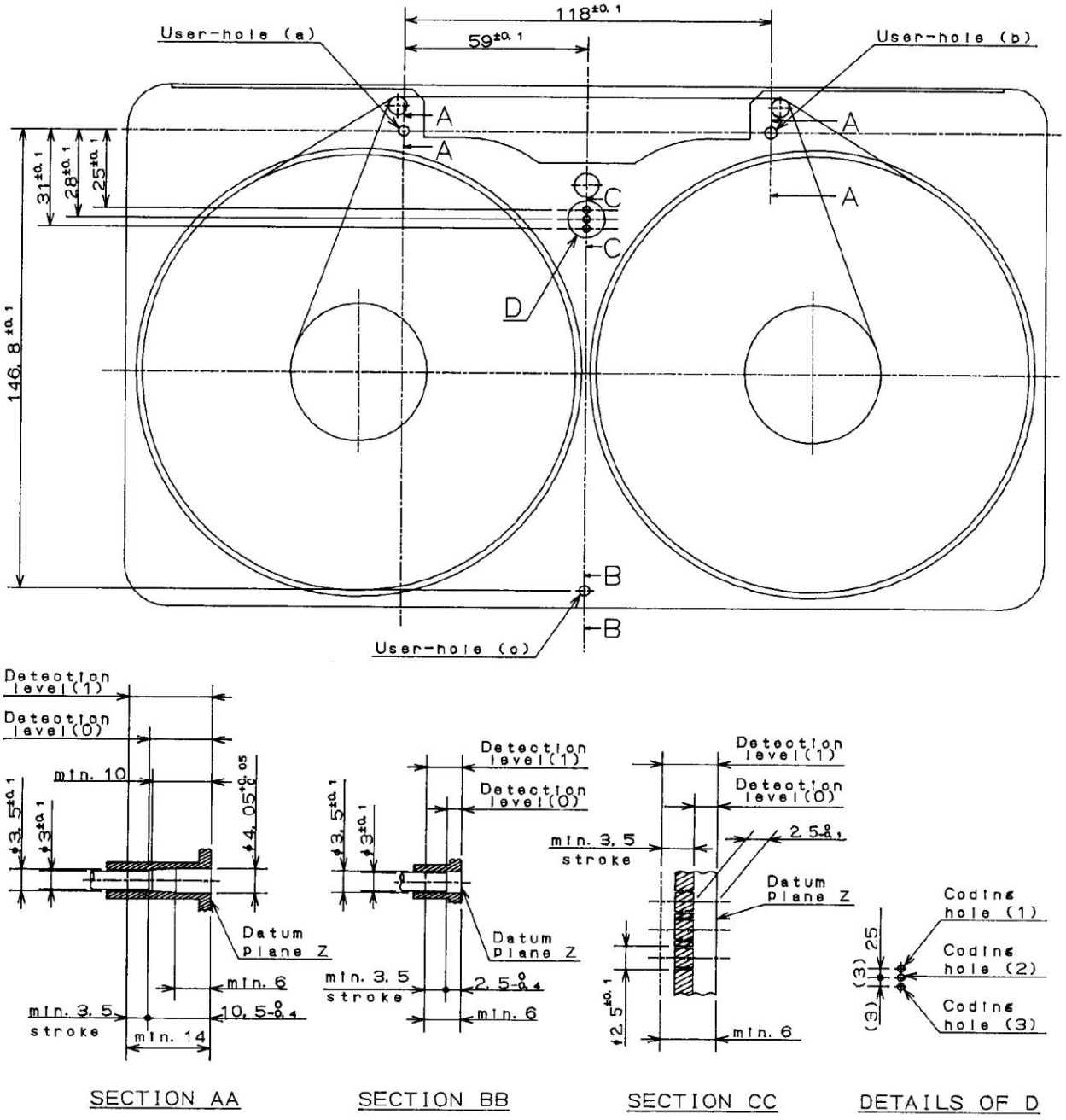
Figure 19 – S cassette coding holes and user holes



Dimensions in millimeters

NOTES
1 The cassette shall be provided with three coding holes (1) to (3) and three user holes (a) to (c).
2 User holes (a) to (c) on the upper shell shall be opened when user plugs are removed.
3 All cassettes shall be provided with holes as defined by sections AA, BB, and CC.

Figure 20 – M cassette coding holes and user holes



Dimensions in millimeters

NOTES
1 The cassette shall be provided with three coding holes (1) to (3) and three user holes (a) to (c).
2 User holes (a) to (c) on the upper shell shall be opened when user plugs are removed.
3 All cassettes shall be provided with holes as defined by sections AA, BB, and CC.

Figure 21 – L cassette coding holes and user holes

3.5.2 The leader/trailer tape material shall be polyester or equivalent having a transmissivity of at least 50% when measured with an 800-nm to 900-nm light source.

3.5.3 When attached to the hub, the leader/trailer tape shall not separate when subjected to a force of 20 N or less.

3.5.4 The width of the leader/trailer tape shall be 12.650 mm ± 0.020 mm.

3.5.5 The thickness of the leader/trailer tape shall be 14 µm to 36 µm.

3.5.6 The splicing tape used to attach the leader/trailer tape shall be applied to the nonmagnetic coated side.

3.6 Reels

3.6.1 The dimensions of the reels and the relationship between the reels and reel tables shall be as specified in figures 22 to 29.

3.6.2 The reels shall be locked automatically when the cassette is removed from the recorder/player. The number and shape of the teeth as well as the locking mechanism are not specified.

3.6.3 When a cassette is inserted into the recorder/player, the reels shall be unlocked automatically by the lighthouse as specified in figure 30. The force needed to release the reel lock shall be less than 1.0 N.

3.6.4 The reels shall be held in position by a reel spring with a force as shown in table 5, when the height of the reel table support is 2.0 mm ± 0.1 mm from datum plane Z as shown in figures 27 to 29.

Table 5 – Reel spring force

Cassette size	Force
S	2.5 ± 0.3 N
M	3.5 ± 0.3 N
L	4.0 ± 0.3 N

3.7 Lid

3.7.1 The lid shall be unlocked and opened by the recorder/player when the cassette is inserted.

3.7.1.1 The lid shall be unlocked by a force of less than 0.3 N exerted upon the release pin, as specified in figures 31 to 33.

3.7.1.2 The inner door shall be lifted by the recorder/player to the position shown in figure 34.

3.7.1.3 The outer door shall be lifted by the recorder/player to the position shown in figures 35 to 37.

3.7.2 The minimum space of cassettes for the VTR loading mechanism shall be as shown in figure 38. The shaded area of figure 38 is intended to indicate to VTR manufacturers the area available for loading (threading) the tape. Note that the dimensions defining this space are not cassette dimensions.

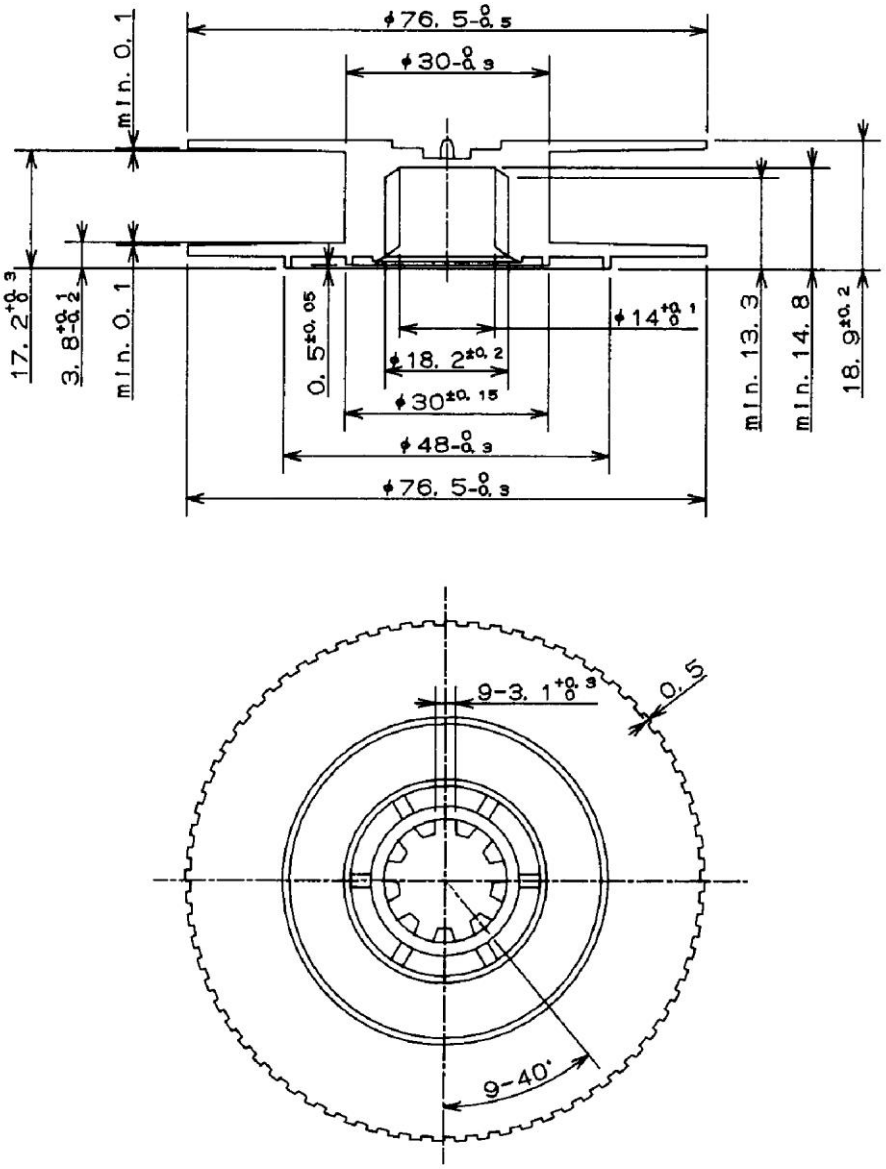
3.7.3 When open, the outer door shall not exceed 37 mm with respect to datum plane Z. Angle γ between the front side surface and datum plane X shall be $93^{o} \pm 2^{o}$, as specified in figure 39.

3.7.4 When the cassette is removed from the recorder/player, the lid shall lock automatically.

3.7.5 The maximum force to open the lid shall be less than 1 N for S and M cassettes and 1.5 N for L

cassettes up to the 25-mm minimum height defined in figure 39.

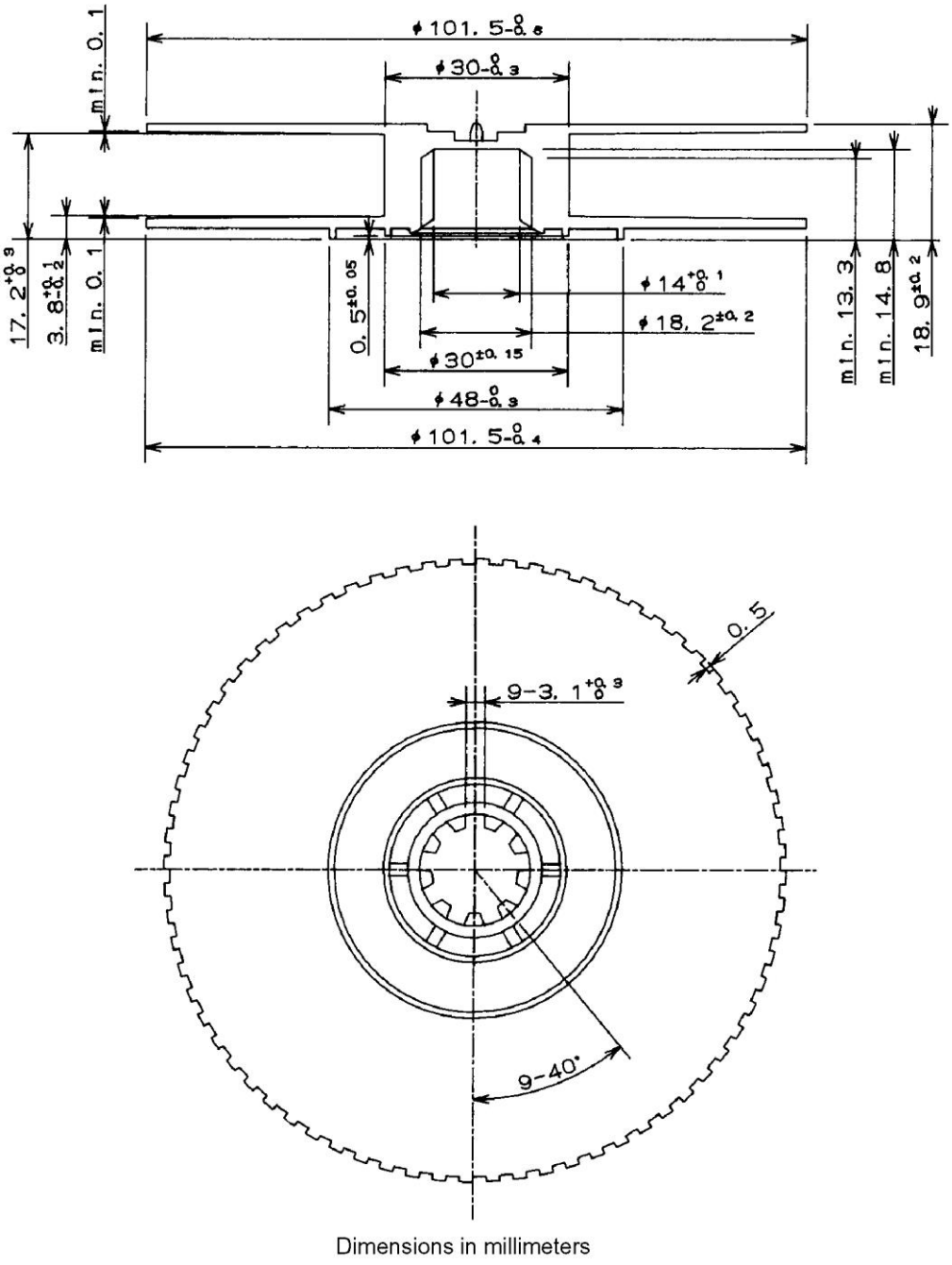
3.7.6 The force required to open the lid shall be applied 90° +5° –0° to datum plane Z at the opening and closing areas as shown in figures 34 to 37.



Dimensions in millimeters

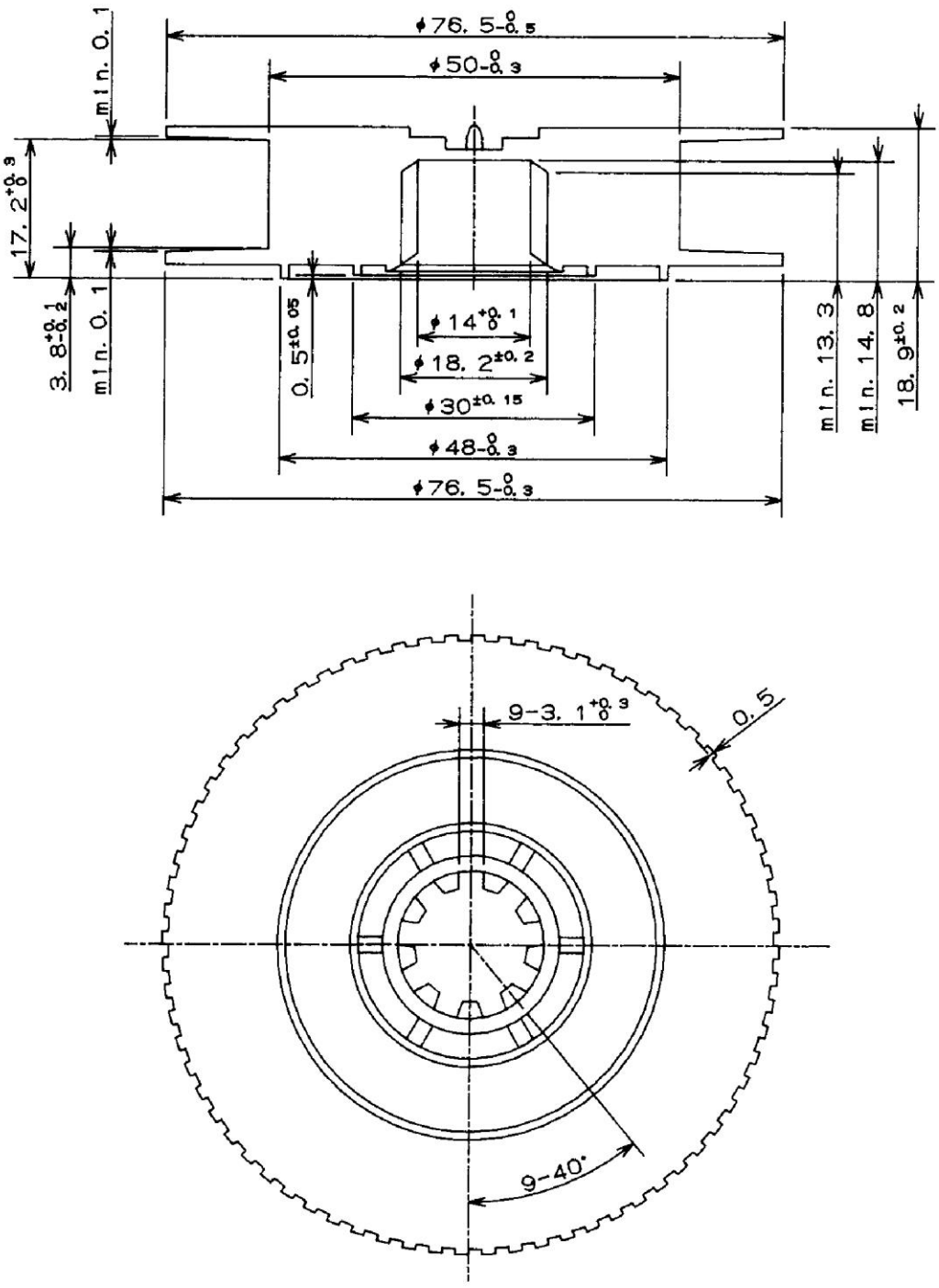
NOTE – The center of the reel and the reel table shall be positioned on either the center of the area 30.00 mm ± 0.15 mm in diameter or the center of the area 48.0 mm +0 mm –0.3 mm in diameter.

Figure 22 – Video cassette reel of 30-mm hub of S cassette



NOTE – The center of the reel and the reel table shall be positioned on either the center of the area 30.00 mm ± 0.15 mm in diameter or the center of the area 48.0 mm +0 mm –0.3 mm in diameter.

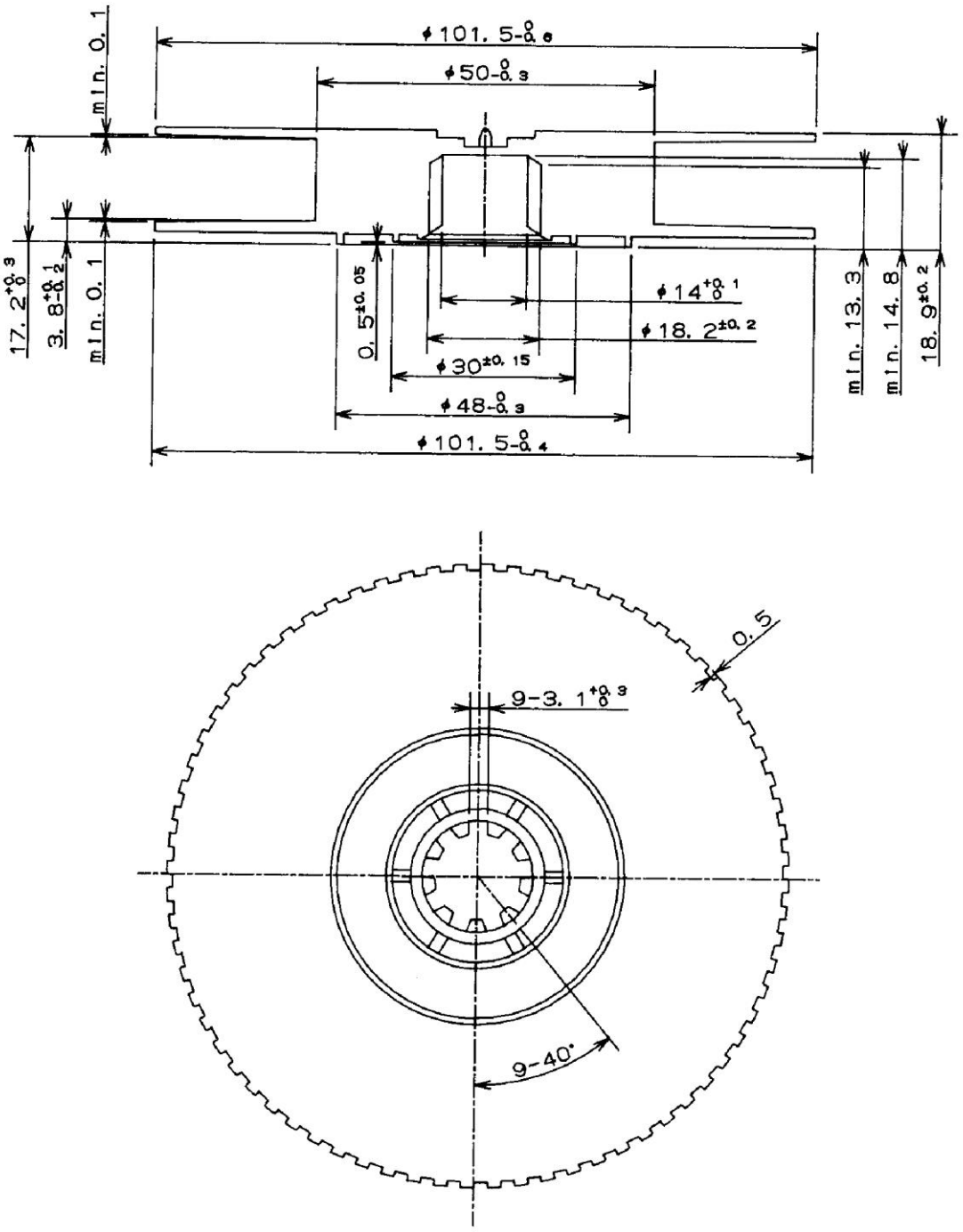
Figure 23 – Video cassette reel of 30-mm hub of M cassette



Dimensions in millimeters

NOTE – The center of the reel and the reel table shall be positioned on either the center of the area 30.00 mm ± 0.15 mm in diameter or the center of the area 48.0 mm +0 mm –0.3 mm in diameter.

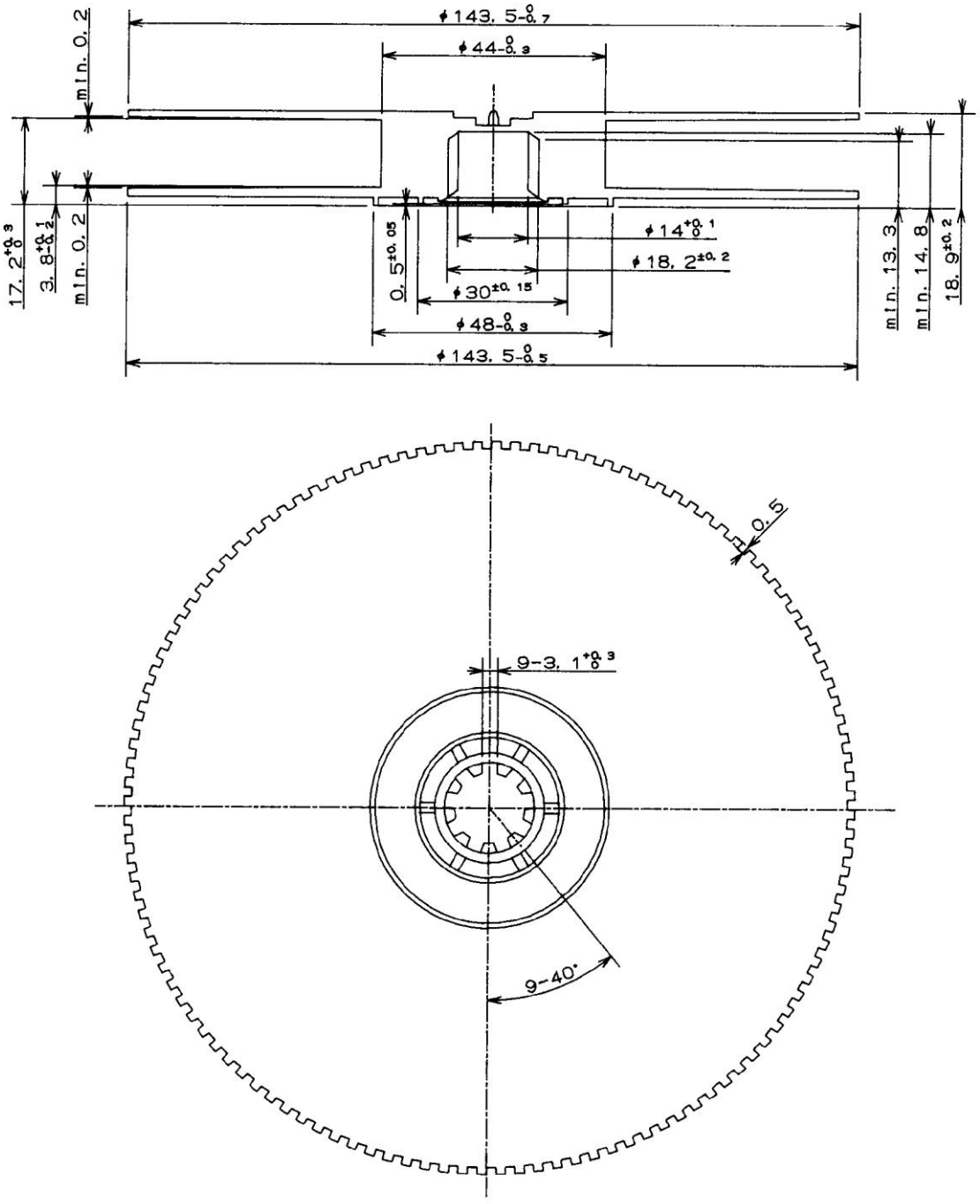
Figure 24 – Video cassette reel of 50-mm hub of S cassette



Dimensions in millimeters

NOTE – The center of the reel and the reel table shall be positioned on either the center of the area 30.00 mm ± 0.15 mm in diameter or the center of the area 48.0 mm +0 mm –0.3 mm in diameter.

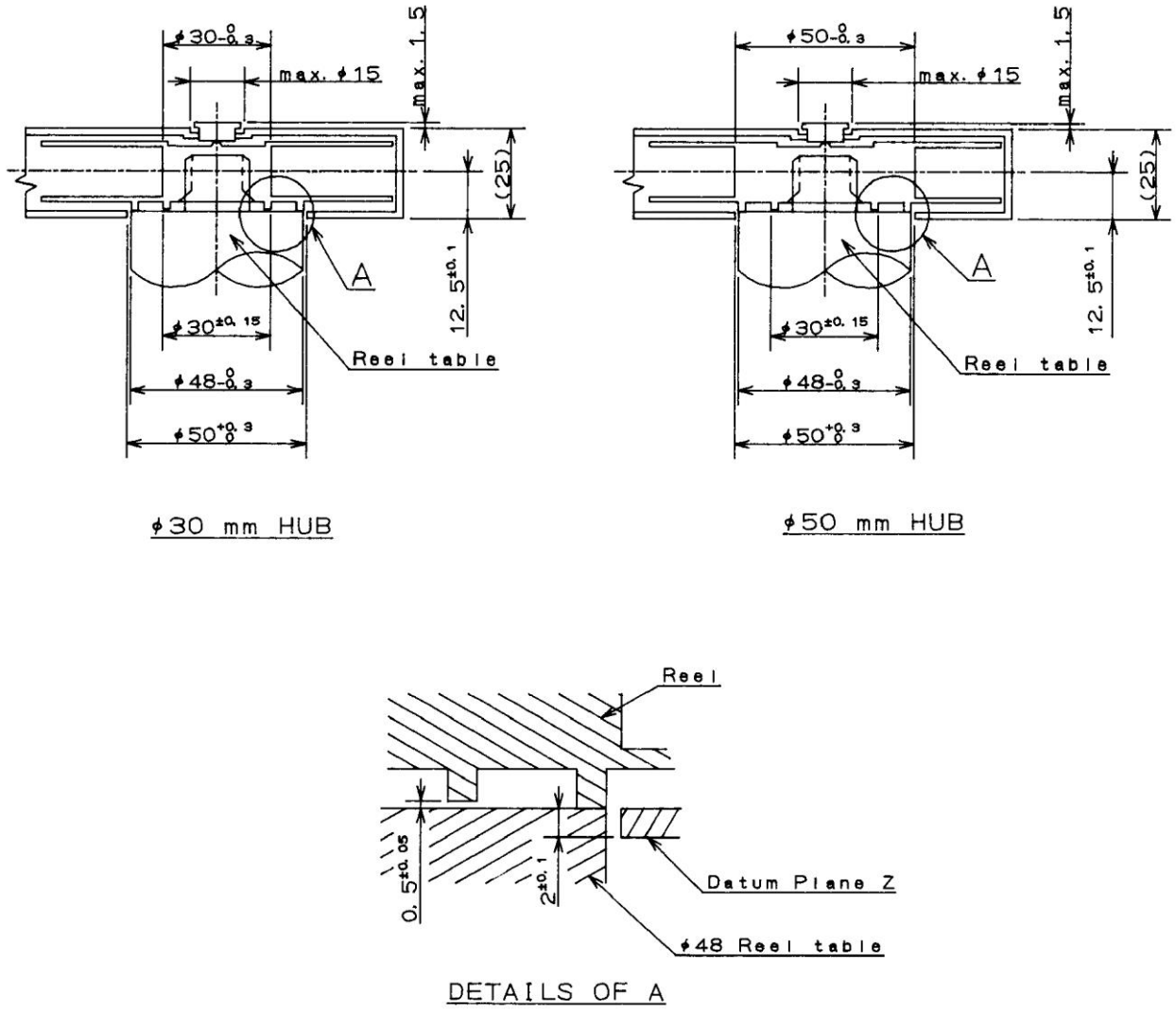
Figure 25 – Video cassette reel of 50-mm hub of M cassette



Dimensions in millimeters

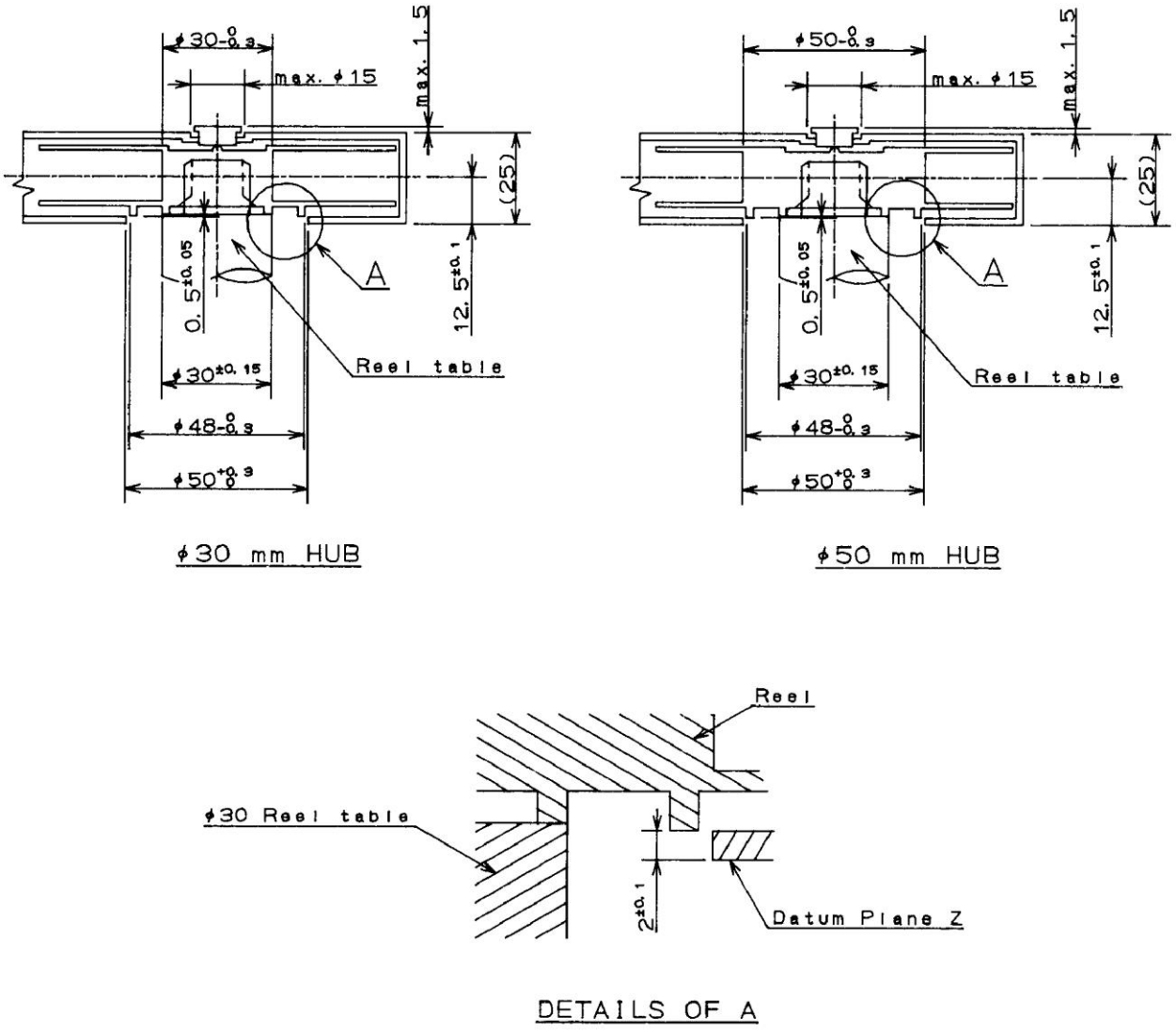
NOTE – The center of the reel and the reel table shall be positioned on either the center of the area 30.00 mm ± 0.15 mm in diameter or the center of the area 48.0 mm +0 mm –0.3 mm in diameter.

Figure 26 – Video cassette reel of L cassette



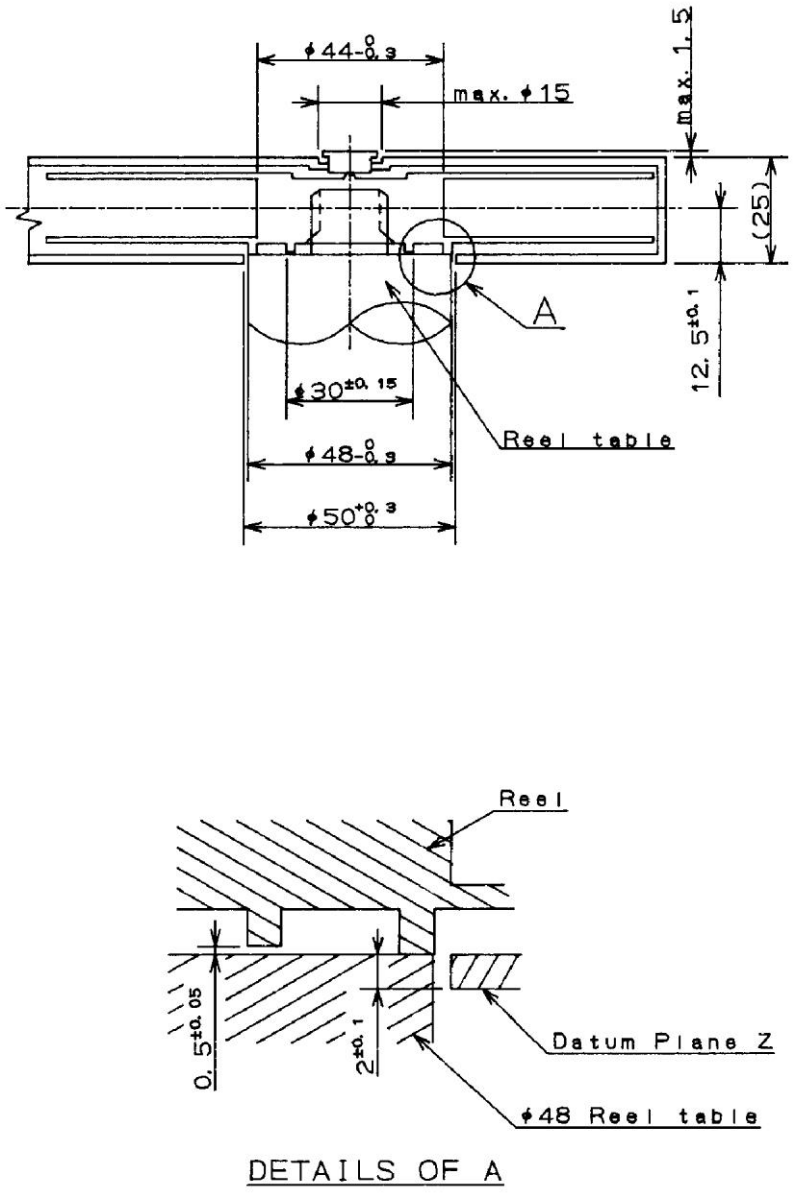
Dimensions in millimeters

Figure 27 – Relationship between reel and large reel table of S and M cassettes



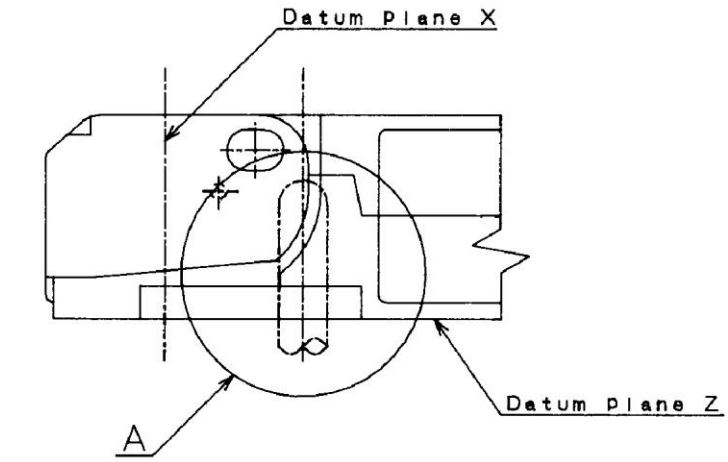
Dimensions in millimeters

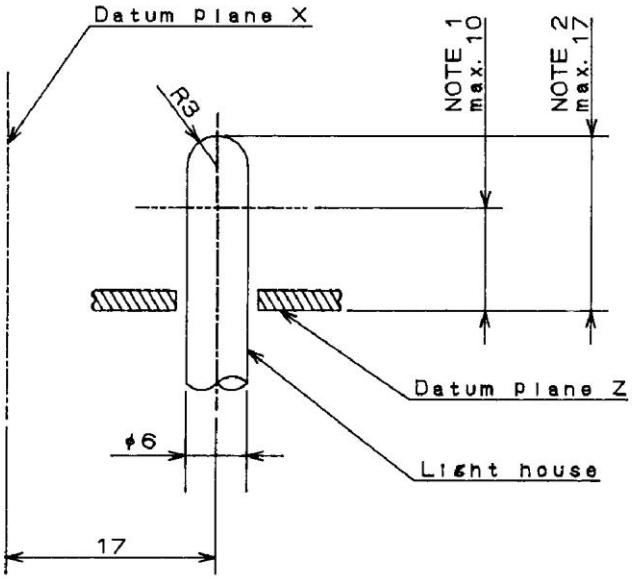
Figure 28 – Relationship between reel and small reel table of S and M cassettes



Dimensions in millimeters

Figure 29 – Relationship between reel and reel table of L cassette





DETAILS OF A

Dimensions in millimeters

NOTES
1 The reel lock shall be released when the lighthouse is located 10 mm maximum away from datum plane Z.
2 The lighthouse shall be located 17 mm maximum away from datum plane Z.

Figure 30 – Reel lock and release of S, M and L cassettes

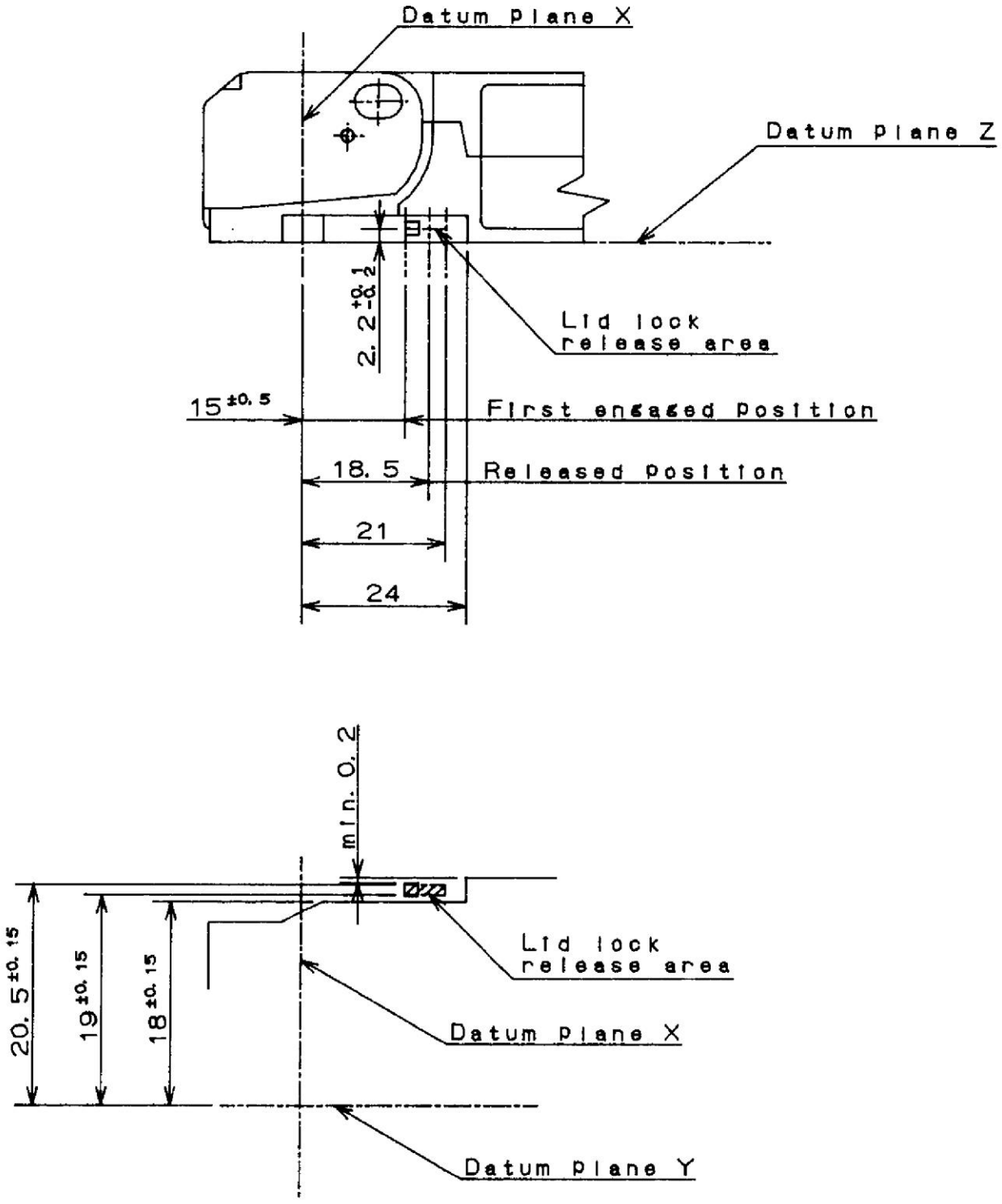


Figure 31 – Lid lock and release of S cassette

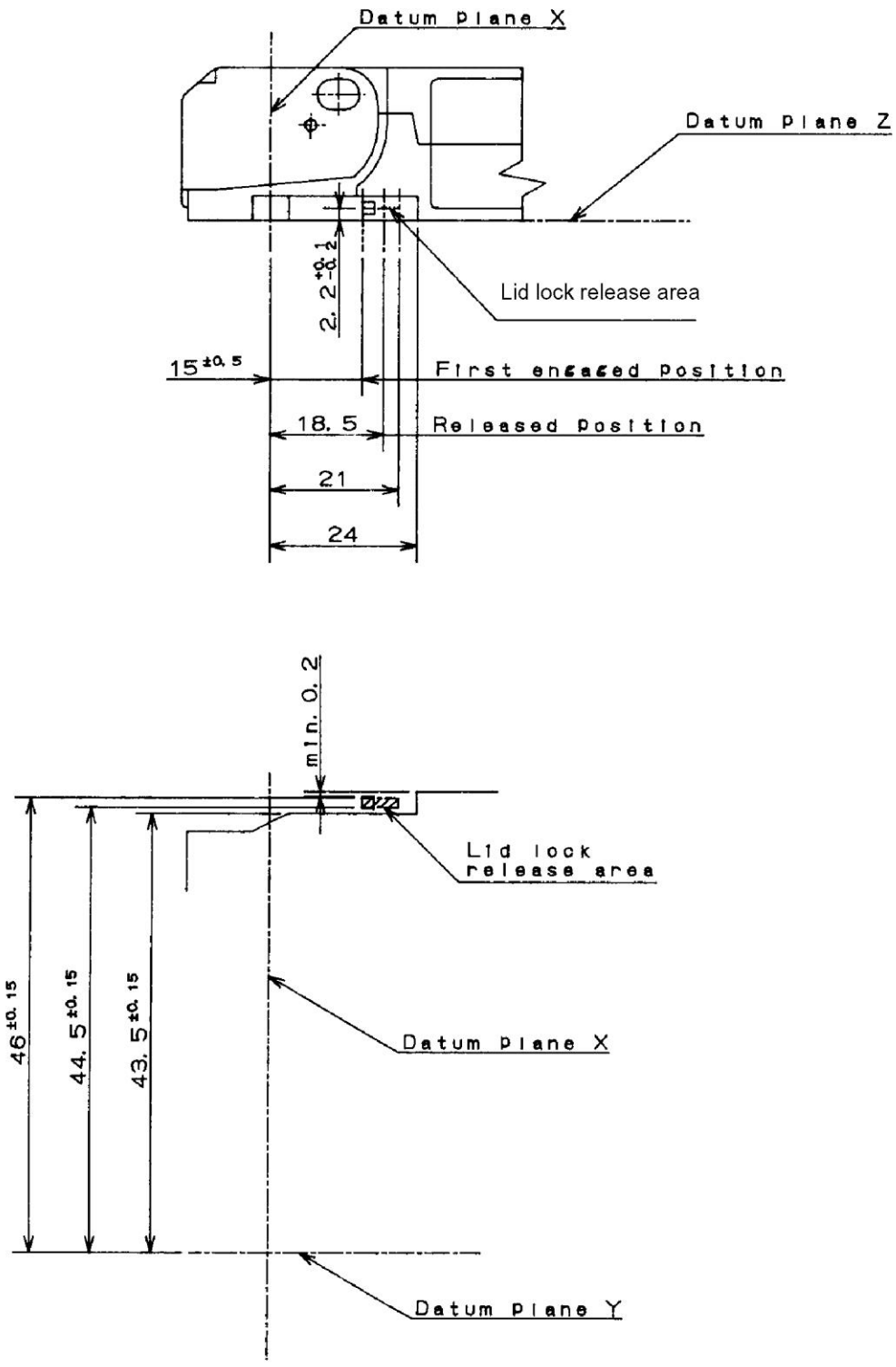
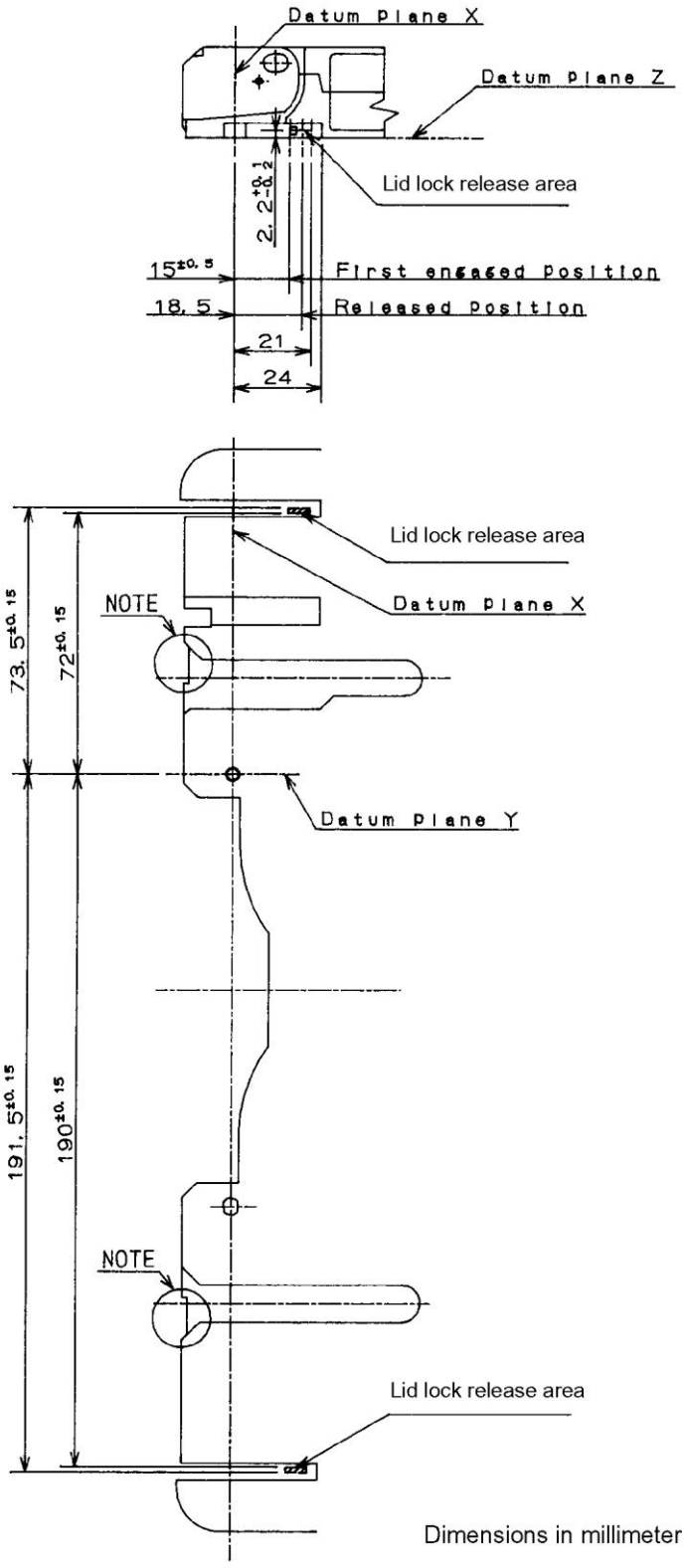
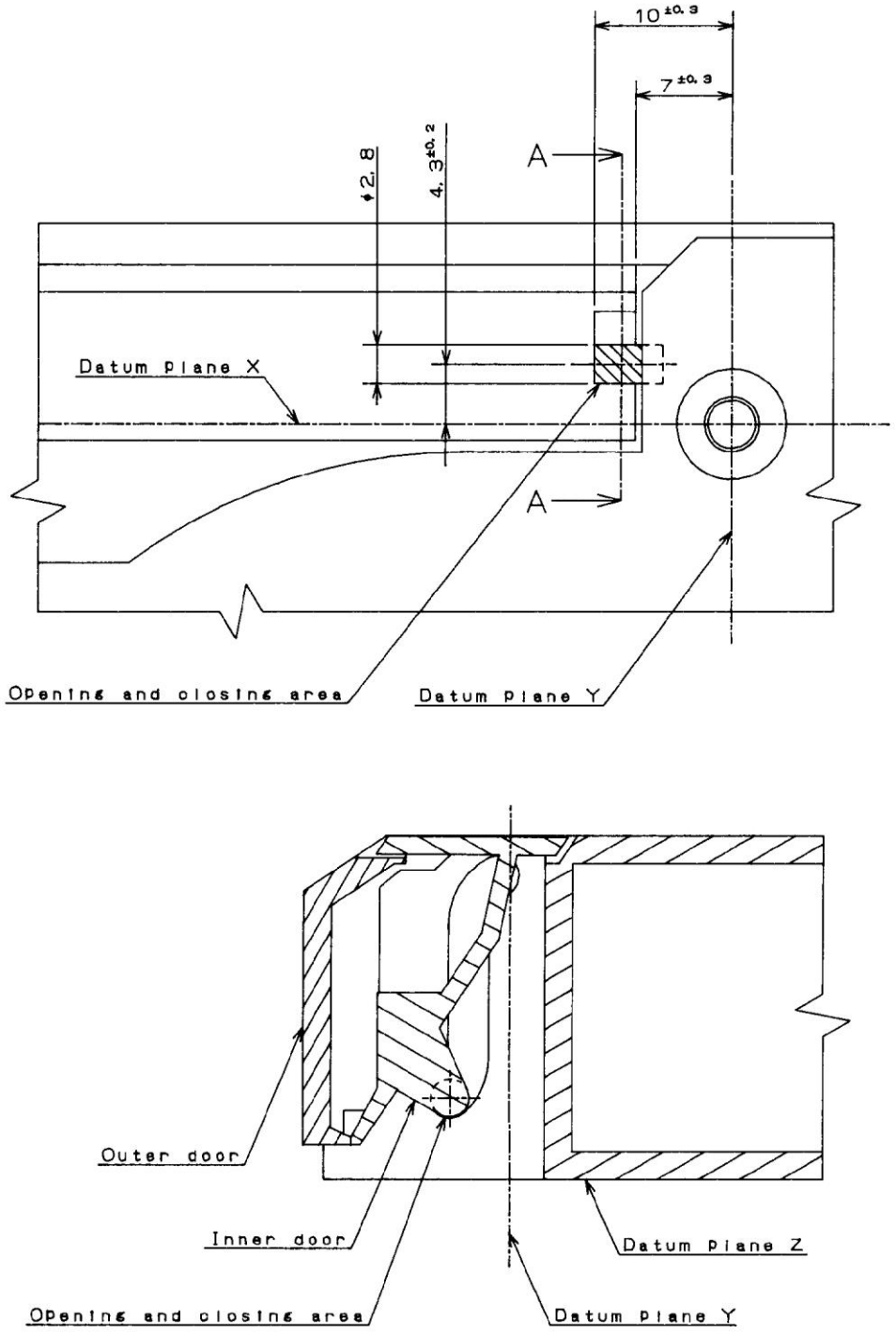


Figure 32 – Lid lock and release of M cassette



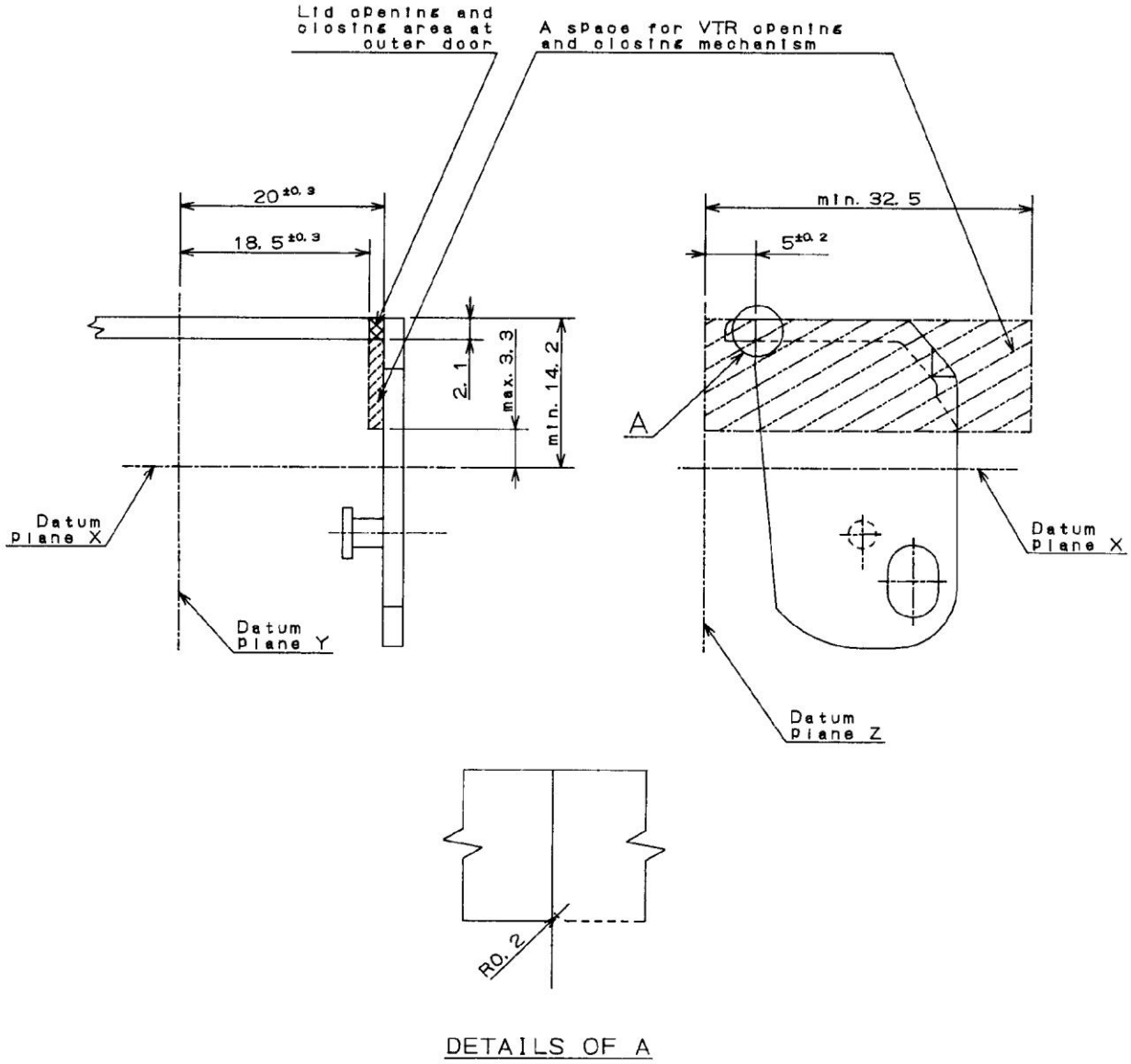
NOTE – “Cutout” is not mandatory.

Figure 33 – Lid lock and release of L cassette



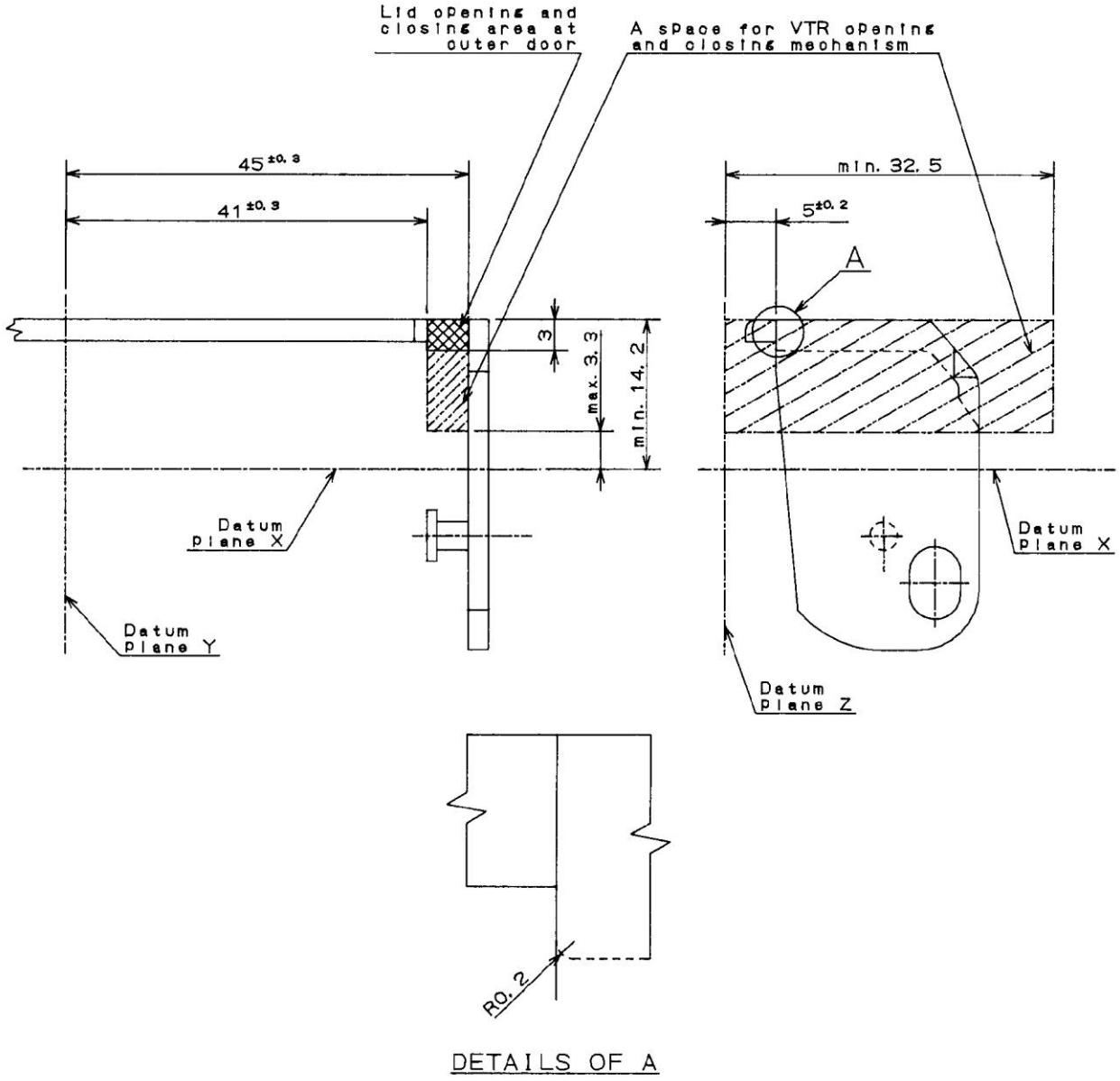
Dimensions in millimeters

Figure 34 – Opening and closing area at inner door of S, M and L cassettes



Dimensions in millimeters

Figure 35 – Opening and closing area at outer door of S cassette



Dimensions in millimeters

Figure 36 – Opening and closing area at outer door of M cassette

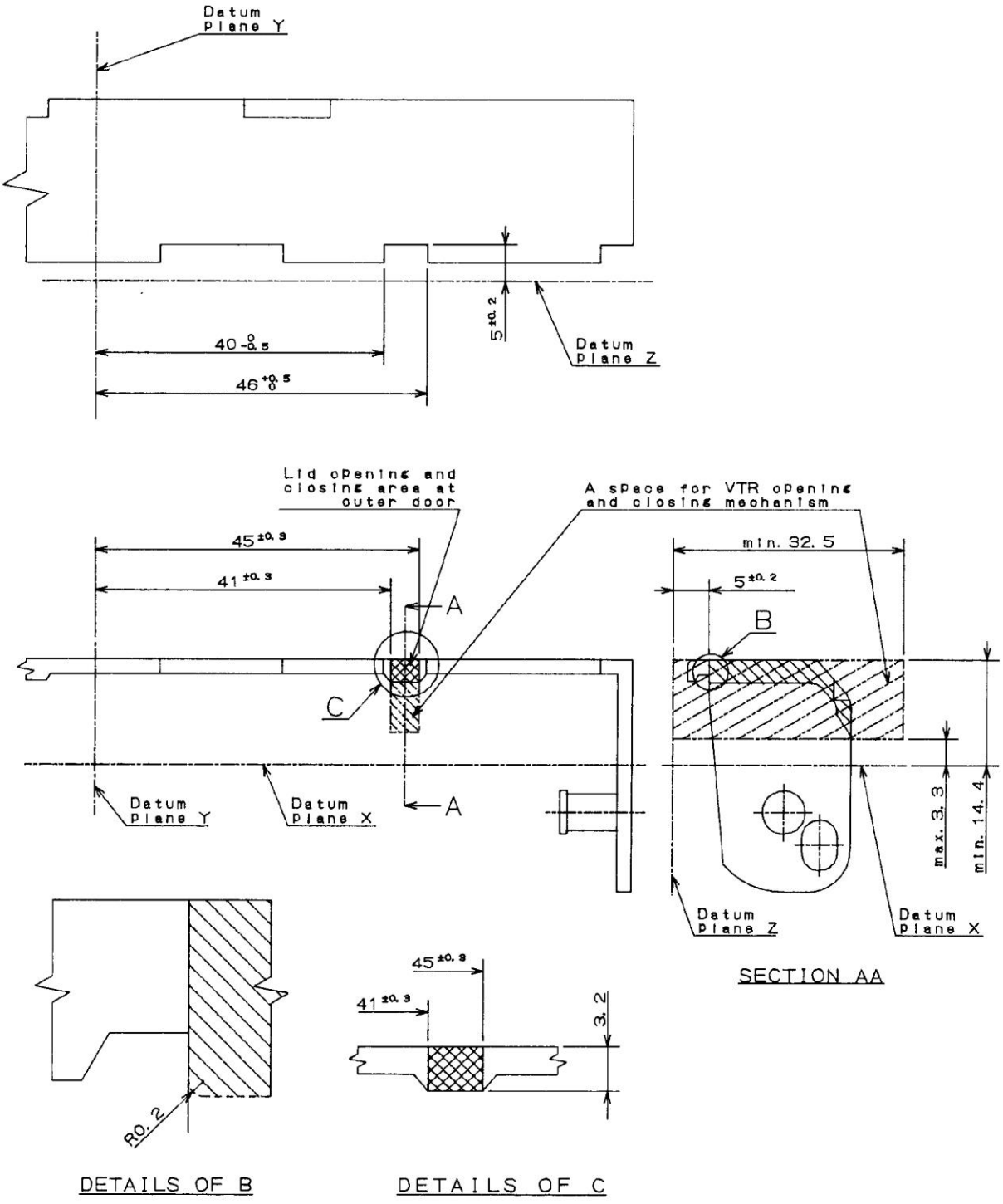


Figure 37 – Opening and closing area at outer door of L cassette

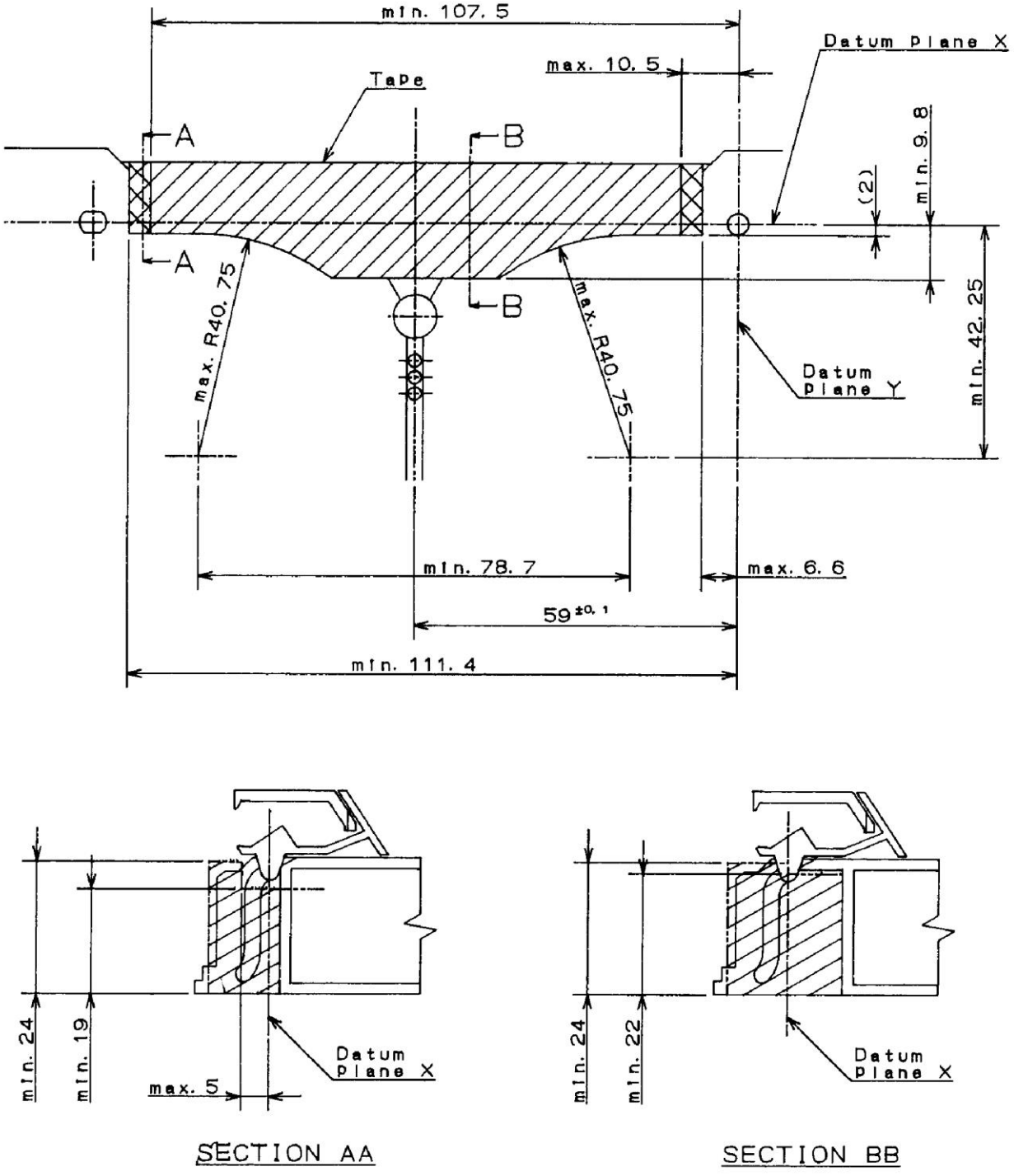
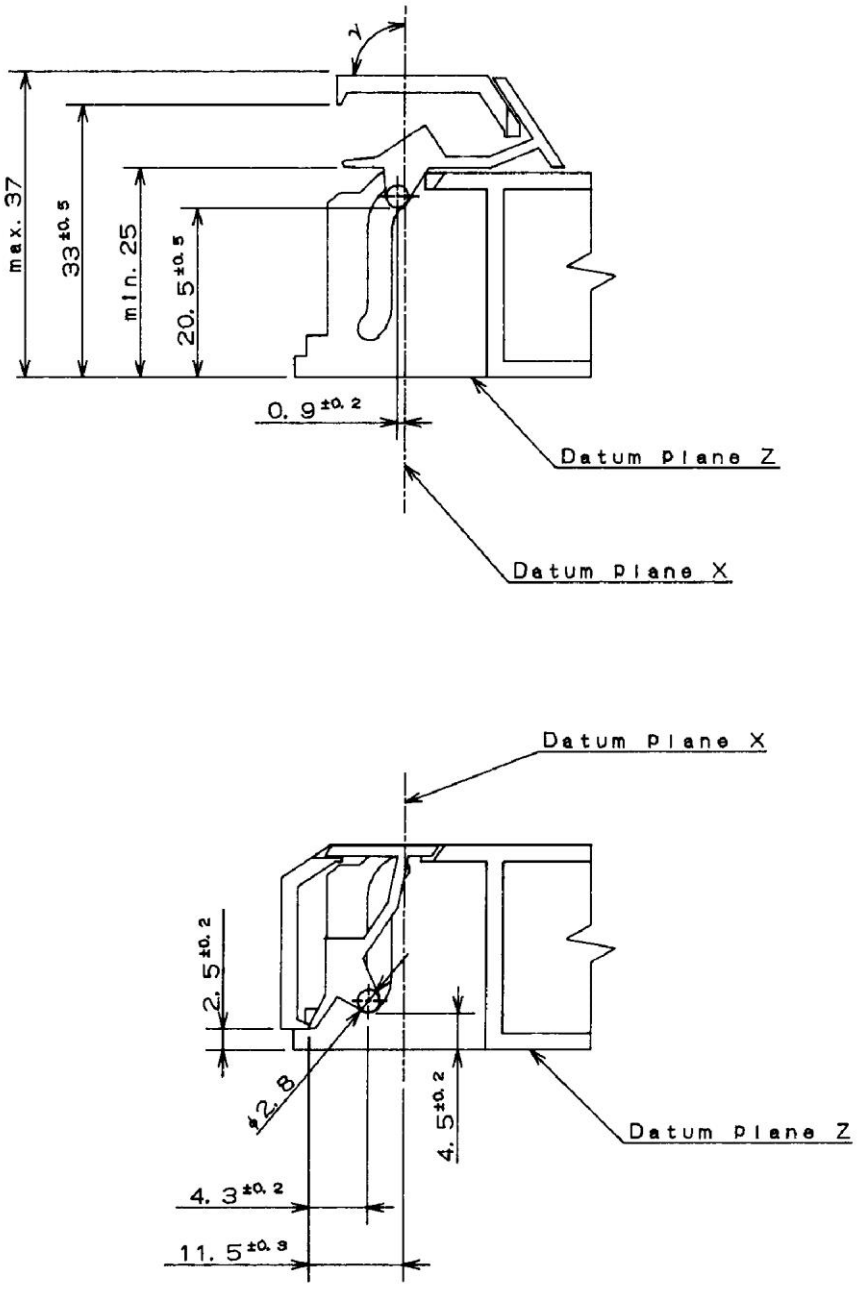


Figure 38 – Space of S, M and L cassettes for VTR loading mechanism



Dimensions in millimeters

NOTE – Lid shall open to a height of at least 25 mm.

Figure 39 – Lid structure of S, M and L cassettes

Annex A (informative)
Cassette user holes

Clause 3.4.3 defines the status of cassette user holes a, b and c. The relevant figures showing the user holes are figures 19, 20, and 21.

When the plug in a user hole is disengaged (pushed in), its position corresponds to status 0; when it is engaged (pushed up), its position corresponds to status 1.

Use of cassette user holes is up to the user and, therefore, their use is optional.

Table A.1 – User holes status indication

User hole A	User hole B	User hole C	Note
1	X	X	Total record lockout
0	1	X	Video and CTL track lockout
	0	X	Recording enabled
X	X	1	May indicate 4ch audio track recording [1)]
X	X	0	May indicate 8ch audio track recording [1)]

NOTES
1 = Plug up
0 = Plug down
X = Do not care state

[1)] The optional use of the cassette user hole c described in this annex is intended only for D-14 and D-15 formats.

To provide a user readable notification for the user on number of audio tracks that might be recorded, the tape cassette manufacturer might elect to provide an ink-printed legend on the top of the cassette shell.

An example of the optional ink printed pattern indication status of the user hole c is shown in figure A.1.

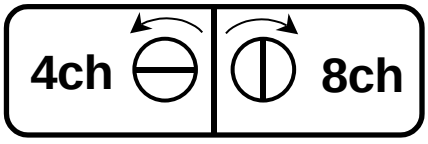


Figure A.1 – An example of optional inked pattern for user hole “c”

Annex B (informative)
Tape formats

The following tape formats use the cassettes defined in this standard:

SMPTE 264M-1998, Television Digital Recording — 1/2-in Type D-3 Composite Format — 525/60

SMPTE 265M-1998, Television Digital Recording —1/2-in Type D-3 Composite Format — 625/50

SMPTE 279M-2001 – Digital Video Recording — 1/2-in Type D-5 Standard-Definition Component Video and Type HD-D5 High-Definition Video Compressed Data

SMPTE 398M-2004, Digital Video Recording — 1/2-in Type D-14 Component Format 525/60 and 625/50

SMPTE 399M-2004, Digital Video Recording — 1/2-in Type D-15 High-Definition Compressed Video Data Format

Annex C (informative)
Bibliography

SMPTE 264M-1998, Television Digital Recording — 1/2-in Type D-3 Composite Format — 525/60

SMPTE 265M-1998, Television Digital Recording —1/2-in Type D-3 Composite Format — 625/50

SMPTE 279M-2001 – Digital Video Recording — 1/2-in Type D-5 Standard-Definition Component Video and Type HD-D5 High-Definition Video Compressed Data

SMPTE 398M-2004, Digital Video Recording — 1/2-in Type D-14 Component Format 525/60 and 625/50

SMPTE 399M-2004, Digital Video Recording — 1/2-in Type D-15 High-Definition Compressed Video Data Format

SMPTE EG 21-1997, Nomenclature for Television Digital Recording of 19-mm Type D-1 Component and Type D-2 Composite Formats