ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA-56

SELF-LOADING CARTRIDGES

FOR

12,7 mm WIDE MAGNETIC TAPES

September 1978

Free copies of this document are available from ECMA,
European Computer Manufacturers Association,
114 Rue du Rhône — 1204 Geneva (Switzerland)

ECMA
EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA-56

SELF-LOADING CARTRIDGES
FOR
12,7 mm WIDE MAGNETIC TAPES

September 1978

1. SCOPE

This Standard ECMA-56 is intended to provide mechanical and functional interchangeability requirements for self-loading cartridges, to be used with reels of 12,7 mm wide magnetic tape.

Minimum dimensional and functional requirements of the cartridge are given, in order to ensure interchangeability of cartridges between tape drives designed for self-loading operation. Some dimensions and features, other than those strictly required for interchangeability, are also given but have to be considered as recommended or optional.

Requirements are also given for the magnetic tape and the reel to be used in conjunction with the cartridge.

2. MATERIAL

The cartridge shall be made from non-flammable material. A flammable material is a material which will ignite from a match flame and when so ignited will continue to burn in a still carbon dioxide atmosphere.

3. ENVIRONMENT

3.1 Testing Environment

Tests and measurements made to check the requirements of this Standard shall be carried out under following conditions:

Temperature	:	23°C ± 2°C
RH	:	40% to 60%
Conditioning before testing:		24 hours

3.2 Operating Environment

Temperature	:	16°C to 32°C
RH	:	20% to 80%
Wet bulb temperature	:	not greater than 25°C

3.3 Storage Environment

3.3.1 Cartridges loaded with unrecorded tapes

Temperature	:	5°C to 48°C
RH	:	20% to 80%
Wet bulb temperature	:	not greater than 26°C

3.3.2 Cartridges loaded with recorded tapes

Temperature	:	5°C to 32°C
RH	:	20% to 80%
Wet bulb temperature	:	not greater than 25°C

3.3.3 Cartridges without tape

Temperature and RH of storage environment for cartridges without tape should be according to the recommendations of the manufacturer of the cartridge.

4. DESCRIPTION

4.1 General

The self-loading cartridge is a collar which can be attached to the rim of a reel of magnetic tape and protect the tape against dust and contamination during storage and handling.

The collar is provided with an opening mechanism which permits it to be opened by mechanical means, and is furthermore provided with a system of air distribution channels which will allow the tape to be driven out of the opening pneumatically for the purpose of automatic loading on a suitably designed tape transport.

4.2 Types

There are two types of self-loading cartridges, type A and type B, having no functional differences.

However, they differ in some dimensional characteristics, in particular in their widths.

A tape drive should have provisions for accepting both types, but because of the dimensional differences existing between the two types, there might be tape drives which accept only type A or only type B.

4.3 Description

The self loading cartridge shall have a latch device for opening and closing. When opening the latch, the collar shall expand to such extent as to provide manual insertion and extraction of the reel. When the latch is closed, the inside surface of the collar shall come into firm contact with the flanges of the reel.

4.4 Operation

4.4.1 Mounting

The cartridge, in closed position, with reel and tape, shall be mounted on the tape drive.

Proper positioning of the cartridge shall be determined, in the direction of the axis of the reel, by the interface between the reel and the drive's hub, and, in the angular direction, by a tangential restraint key and a corresponding restraint of the drive.

4.4.2 Opening

By a circular movement of a pin from the tape drive engaging

a slotted hole in the latch, the cartridge shall reach its open position.

In the open position, the cartridge shall be expanded so that the reel shall be free to rotate inside the collar, without touching it.

4.4.3 Restraint keys

In the open position, the cartridge shall be held in place by tangential and axial restraint keys and corresponding restraints of the drive.

4.4.4 Air intake and air exit

On the outside surface of the collar, there shall be an air intake area.

In the open position, this area shall come into contact with an air supply nozzle of the tape drive.

4.4.5 Tape exit

The collar shall be provided with a tape exit opening. In the closed position of the cartridge, this opening shall be shut. In the open position of the cartridge, this opening shall be open.

4.4.6 Tape loading

When the cartridge is in open position, air applied to the air intake area shall be capable of detaching the free end of the tape from the tape pack, and, in combination with the rotating action of the reel, of leading the tape end through the tape exit.

4.4.7 Closing

After rewinding the tape completely back on to the reel, the cartridge is brought back from the open position to the closed position by a circular movement of the pin engaging the slotted hole in the latch.

The circular movement is exactly the reverse of the movement necessary for opening.

4.5 Drawings

In the drawing a typical construction is shown for ease of understanding of the dimensional requirements.

Fig. 1 shows the back side of the cartridge in closed position with partial view I-I,

Fig. 2 shows the front side of the cartridge in open position,

Fig. 3 is an enlarged view of Fig. 1 with partial views II-II to IX-IX,

Fig. 4 is an enlarged view of Fig. 2 with partial view X-X,

Fig. 5 shows the hook,

Fig. 6 shows a Reference Orifice in cross-section,

Fig. 7 shows the reel.

5. DIMENSIONS

The dimensions given for the cartridge in closed position are referred to two perpendicular axes X and Y. The relative angular position of the cartridge with regard to these axes is defined by an angle

$$A_0 = 24^o \text{ nominal}$$

of the vertical axis Y with the symmetry axis of the tangential restraint key.

Unless otherwise stated all dimensions apply to both types.

5.1 Outer Radius (Fig. 3 and view VII-VII)

The outer radius shall be:

$$R_1 = 137,2 \text{ mm} \pm 0,4 \text{ mm}$$

5.2 Width (Views VII-VII in Fig. 3)

The width shall be:

For type A : $W_1 = 28,58 \text{ mm} \pm 0,13 \text{ mm}$

For type B : $W_1 = 22,73 \text{ mm} \pm 0,13 \text{ mm}$

NOTE: In the case when stacking rings are provided, the dimensions in 7.2 are to be taken into account.

5.3 Radius of the front flange (Fig. 3 and view VII-VII)

The radius of the front flange shall be (see also 7.2):

For type A: $R_2 = 130,0 \text{ mm} \pm 0,4 \text{ mm}$

For type B: $R_2 = 130,0 \text{ mm} \pm 1,0 \text{ mm}$

5.4 Radius of the back flange (Fig. 3 and view VII-VII)

The radius of the back flange shall be:

For type A: $R_3 = 125,73 \text{ mm} \pm 0,25 \text{ mm}$

For type B: $R_3 = 130,0 \text{ mm} \pm 1,0 \text{ mm}$

5.5 Tangential Restraint Key (Fig. 3 and views VIII-VIII and IX-IX)

5.5.1 Height

The height of this key shall be:

$$H_1 = 6,35 \text{ mm} \pm 0,25 \text{ mm}$$

Fig. 4 is an enlarged view of Fig. 2 with partial view X-X,

Fig. 5 shows the hook,

Fig. 6 shows a Reference Orifice in cross-section,

Fig. 7 shows the reel.

5. DIMENSIONS

The dimensions given for the cartridge in closed position are referred to two perpendicular axes X and Y. The relative angular position of the cartridge with regard to these axes is defined by an angle

$$A_0 = 24^o \text{ nominal}$$

of the vertical axis Y with the symmetry axis of the tangential restraint key.

Unless otherwise stated all dimensions apply to both types.

5.1 Outer Radius (Fig. 3 and view VII-VII)

The outer radius shall be:

$$R_1 = 137,2 \text{ mm} \pm 0,4 \text{ mm}$$

5.2 Width (Views VII-VII in Fig. 3)

The width shall be:

For type A : $W_1 = 28,58 \text{ mm} \pm 0,13 \text{ mm}$

For type B : $W_1 = 22,73 \text{ mm} \pm 0,13 \text{ mm}$

NOTE: In the case when stacking rings are provided, the dimensions in 7.2 are to be taken into account.

5.3 Radius of the front flange (Fig. 3 and view VII-VII)

The radius of the front flange shall be (see also 7.2):

For type A: $R_2 = 130,0 \text{ mm} \pm 0,4 \text{ mm}$

For type B: $R_2 = 130,0 \text{ mm} \pm 1,0 \text{ mm}$

5.4 Radius of the back flange (Fig. 3 and view VII-VII)

The radius of the back flange shall be:

For type A: $R_3 = 125,73 \text{ mm} \pm 0,25 \text{ mm}$

For type B: $R_3 = 130,0 \text{ mm} \pm 1,0 \text{ mm}$

5.5 Tangential Restraint Key (Fig. 3 and views VIII-VIII and IX-IX)

5.5.1 Height

The height of this key shall be:

$$H_1 = 6,35 \text{ mm} \pm 0,25 \text{ mm}$$

5.5.2 Width

The width of this key at its base shall be:

W_2 = 12,50 mm ± 0,13 mm

This key may be tapered up to 5° on both sides.

5.5.3 Length

The length of this key at its base shall be:

For type A: L_1 = 28,58 mm ± 0,13 mm

For type B: L_1 = 22,73 mm ± 0,13 mm

5.5.4 Taper

This key shall be tapered at both ends for type A and only at the back side end for type B.

Type A (View VIII-VIII)

L_2 = 3,17 mm ± 0,13 mm

L_3 = 6,35 mm ± 0,25 mm

L_4 = 6,35 mm ± 0,13 mm

Type B (View IX-IX)

A_1 = 10° ± 30'

L_3 = 6,35 mm ± 0,13 mm

5.5.5 Position

By definition the position of this key shall be:

A_0 = 24° nominal

5.6 Axial Restraint Key (Fig. 3 and views VIII-VIII and IX-IX)

This key is mandatory for type A and optional for type B.

5.6.1 Height

The height of this key shall be:

H_1 = 6,35 mm ± 0,25 mm

5.6.2 Width

The width of this key at its base shall be:

W_2 = 12,50 mm ± 0,13 mm

This key may be tapered up to 5° on both sides.

5.6.3 Length

The length of this key at its base shall be:

For type A: L_1 = 28,58 mm ± 0,13 mm

For type B: L_1 = 22,73 mm ± 0,13 mm

5.6.4 Taper

This key shall be tapered at both ends for type A and only at the back side end for type B.

Type A (View VIII-VIII)

$L_2 = 3,17 \text{ mm} \pm 0,13 \text{ mm}$

$L_3 = 6,35 \text{ mm} \pm 0,25 \text{ mm}$

$L_4 = 6,35 \text{ mm} \pm 0,13 \text{ mm}$

Type B (View IX-IX)

$A_1 = 10^{\circ} \pm 30'$

$L_3 = 6,35 \text{ mm} \pm 0,25 \text{ mm}$

5.6.5 Position

The angular position of this key shall be:

$A_2 = 43^{\circ} \pm 30'$

5.7 Upper Restraint Keys (Fig. 3 and views II-II and III-III)

These four keys are mandatory for type B only. There shall be four such keys, two on each side of the rim, so as to leave between their slanted surfaces a free path centred about the symmetry plane of the cartridge.

5.7.1 Height

The height of these keys shall be:

$H_2 = 2,29 \text{ mm} \pm 0,13 \text{ mm}$

5.7.2 Width

The width of these keys shall be:

$W_3 = 9,9 \text{ mm max}$

5.7.3 Width of the free path

The width of the free path shall be:

$W_4 = 2,29 \text{ mm} \pm 0,20 \text{ mm}$

5.7.4 Position

These keys shall be positioned within areas defined by:

$A_3 = 7^{\circ}30' \pm 1^{\circ}$

$A_4 = 5^{\circ}45' \pm 1^{\circ}$

$A_5 = 18^{\circ} \pm 1^{\circ}$

$A_6 = 29^{\circ}21' \pm 1^{\circ}$

5.8 Lower Restraint Keys (Fig. 3 and views IV-IV and V-V)

These keys, in general two, are mandatory for type B only. Their base is centred about the symmetry plane of the cartridge within 0,13 mm.

5.8.1 Height

Their height shall be:

$$H_3 = 1{,}52 \text{ mm} \pm \begin{matrix} 0{,}00 \text{ mm} \\ 0{,}25 \text{ mm} \end{matrix}$$

5.8.2 Width

Their width at their base shall be:

$$W_5 = 13{,}97 \text{ mm} \pm \begin{matrix} 0{,}00 \text{ mm} \\ 0{,}25 \text{ mm} \end{matrix}$$

These keys may be tapered so as to facilitate insertion into the corresponding restraint of the drive.

5.8.3 Position

They shall be positioned within an area defined by:

$$A_7 = 14^\circ$$

$$A_8 = 81^\circ$$

5.9 Air Intake Area (View VI-VI in Fig. 3)

5.9.1 Dimensions

The dimensions of the air intake area shall be:

$$W_6 = 7{,}3 \text{ mm max}$$

$$L_5 = 15{,}2 \text{ mm max}$$

5.9.2 Position

The position of the air intake area shall be given by the position of its centre:

$$A_9 = 63^\circ \pm 30'$$

6. CARTRIDGE/DRIVE INTERFACE

The dimensions given for the cartridge in open position and for the relevant elements of the drive are referred to two axes XX, YY, which are the vertical and the horizontal axes through the centre of the driving shaft of the tape drive.

In open position the cartridge shall be expanded so that its outer surface lies between two co-axial cylindrical surfaces of radius 141,03 mm and 141,52 mm respectively.

6.1 Latch Device (Fig. 4)

The latch device shall be actuated by a latch pin of the tape drive.

6.1.1 Co-ordinates of the centre of rotation of the latch pin

The co-ordinates of the centre of rotation of the latch pin shall be:

L_6 = 121,67 mm ± 0,25 mm

L_7 = 85,09 mm ± 0,25 mm

6.1.2 Latch pin path

The latch pin shall travel within a semi circular area defined by:

R_4 = 28,3 mm

R_5 = 35,2 mm

L_8 = 139,0 mm

A_{10} = 193°

The latch pin shall extend beyond the tape path centreline toward the front side by 1,5 mm ± 0,8 mm.

6.1.3 Movement of the latch device

When actuated by the latch pin, no part of the latch device shall extend beyond a straight line parallel to the YY axis and defined by:

L_9 = 43,2 mm min

and beyond a composite line defined by:

L_{10} = 123,5 mm min

R_6 = 50,8 mm min

6.2 Position of the Tangential Restraint Key (Fig. 4)

The position of the tangential restraint key shall be:

A_0 = 24° nominal

6.3 Position of the Air Intake Area (Fig. 4)

The position of the air intake area shall be defined by the position of its centre:

A_{11} = 56° ± 30'

6.4 Tape Exit Opening (Fig. 4 and view X-X)

6.4.1 Length

The tape exit opening shall extend over an angle:

A_{12} = 10° 20' ± 10'

6.4.2 Width

The width of the tape exit opening shall be:

W_7 = 15,88 mm ± 0,13 mm

This opening is centred about the symmetry plane of the cartridge within 0,13 mm.

6.4.3 Position

The position of the leading edge of the tape exit opening shall be:

$A_{13} = 4^{o}\ 25' \pm 10'$

6.4.4 Profile of the tape exit opening

The profile of the tape exit opening is defined by two planes including the leading edge and the trailing edge respectively and tangential to circles defined respectively by:

$R_7 =$ 65 mm max

$R_8 =$ 128 mm max

7. OPTIONAL FEATURES

7.1 Tabs (Fig. 3 and view VII-VII)

At the back side tabs regularly disposed around the inner flange may be provided. In closed position their radius shall be:

$R_9 =$ 100 mm min

7.2 Stacking Rings (Fig. 3 and view VII-VII)

7.2.1 Type A

At the back side stacking rings regularly disposed around the circumference may be provided. In closed position their position shall be defined by:

$R_{10} =$ 128,0 mm $\pm$ 1,0 mm

$H_4 =$ 2,0 mm max

7.2.2 Type B

Stacking rings at the back side and a rim at the front side may be provided. They shall not extend over an angle of 40° centred on the tape exit opening. In closed position their position shall be defined by:

$R_{10} =$ 134,6 mm $\pm$ 0,4 mm

$R_{11} =$ 135,6 mm $\pm$ 0,4 mm

$H_4 =$ 0,51 mm $\pm$ 0,10 mm

$H_5 =$ 0,56 mm $\pm$ 0,10 mm

7.3 Hook (Fig. 5)

The latch device may present a hook. Its dimensions shall be:

$L_{11} =$ 8,00 mm $\pm$ 0,35 mm

$L_{12} =$ 15,11 mm $\pm$ 0,35 mm

8. FUNCTIONAL CHARACTERISTICS

8.1 Mechanical Characteristcs

8.1.1 Unlatching torque

The unlatching torque is the torque required to move the latch past detents.

The unlatching torque shall be 35.10^{-3} N.m minimum, 254.10^{-3} N.m maximum.

8.1.2 Latch opening torque

The latch opening torque is the torque required to operate the latch so as to bring the cartridge from the closed position to the open postion.

The opening torque shall be 254.10^{-3} N.m maximum.

8.1.3 Latch closing torque

The latch closing torque is the torque required to operate the latch so as to bring the cartridge from the open position to the closed position.

The closing torque shall be 254.10^{-3} N.m maximum.

8.2 Pneumatic Characteristics

8.2.1 Reference Orifices (Fig. 6)

In order to determine the pneumatic characteristics described in the following paragraphs, four Reference Orifices Z_1, Z_2, Z_3 and Z_4 are defined. Their dimensions shall be as follows:

Diameter

Reference Orifice Z_1	:	2,083 mm	$\pm$ 0,013 mm
Reference Orifice Z_2	:	3,439 mm	$\pm$ 0,013 mm
Reference Orifice Z_3	:	2,921 mm	$\pm$ 0,013 mm
Reference Orifice Z_4	:	3,193 mm	$\pm$ 0,013 mm

Length

All Reference Orifices shall have the same length

$$L_{13} = 6,35 \text{ mm} \pm 0,13 \text{ mm}$$

Rounding Radius

All Reference Orifices shall have the same rounding radius

$$R_{12} = 1,17 \text{ mm} \pm 0,13 \text{ mm}$$

8.2.2 Operating air pressure

The operating air pressure shall be the air pressure, which, when applied to the air intake area of the cartridge in the open position, shall provoke the detaching of the free end of the tape from the tape pack.

The operating air pressure shall have a value between 4,48 kPa and 7,97 kPa when the air flow is restricted by an orifice the impedance of which is equal or less than that of Reference Orifice Z_3 and equal or greater than that of Reference Orifice Z_2. The pressure shall be measured upstream of the Reference Orifices Z_2 and Z_3 on the tape drive.

8.2.3 Pneumatic impedance

The pneumatic impedance of the cartridge is the resistance to the air flow offered by the cartridge in the open position, as seen at the air intake area.

The pneumatic impedance of the cartridge shall be equal to or grater than the impedance of Reference Orifice Z_2, and equal to or less than the impedance of Reference Orifice Z_3, when compared at a pressure between 4,48 kPa and 7,97 kPa.

9. TAPE REQUIREMENTS

9.1 Width of the Tape

The width of the tape shall be:

$$12{,}7 \text{ mm } {}^{+\ 0{,}0 \text{ mm}}_{-\ 0{,}1 \text{ mm}}$$

9.2 Length of the Tape

Splice-free tested tape shall be available in lengths not exceeding 753 m. If the length of tape is less than 731 m and the length is required to be stated, it shall be subject to a tolerance of +3% - 0%.

9.3 Thickness of Tape

The overall thickness of tape and oxide coating, not including any markers shall be:

$$0{,}048 \text{ mm} \pm 0{,}008 \text{ mm}$$

the maximum coating thickness shall be:

$$0{,}015 \text{ mm}$$

9.4 Material

The tape shall consist of a nominal 0,036 mm thick base material (oriented polyethylene terephthalate or equivalent) coated on one side with a strong yet flexible layer of ferromagnetic material dispersed in a suitable binder.

9.5 "E" Value

The "E" value is the distance measured radially between the

edge of the reel flange and the outside layer of tape, when the tape is wound at a tension between 2 N and 3,6 N on the specified reel. The difference value shall satisfy:

$$6{,}3 \text{ mm} \leqslant \text{E value} \leqslant 15{,}9 \text{ mm}$$

9.6 Elastic Properties

The elastic properties of the tape shall be such that when subjected to a tension of 10 N for a period of threee minutes under any combination of temperature and relative humidity within the ranges of 10 °C to 50 °C and 20% to 80% RH, the permanent elongation measured with negligible tension after a second 3-minute interval shall be less than 0,5%. The elastic modulus for a single smooth application of tension in three minutes or less, down to the time set by the inertia of the tape itself, shall be such that the elongation is less than 0,5% under a tension of 4,5 N. For the convenience of testing, the measurement may be performed with a tension applied for three minutes.

9.7 Longitudinal Curvature

The minimum radius of curvature of an edge of the tape shall be:

33 m

This minimum radius corresponds to a deviation of 3,8 mm from a chord of 1 m, when measured on a piece of tape approx. 1 m unrolled and lying on a flat surface.

9.8 Winding Tension

The tape winding tension shall be between 2 N and 3,6 N. The tape shall be wound, oxide surface toward reel hub, in a clockwise direction, i.e. when the reel is viewed from the front, the loose end of the tape hangs from the right-hand side of the reel.

9.9 Reflective Markers

Reflective Markers used to indicate beginning and end of tape shall be placed on the side of the tape which does not carry the oxide coating. The Beginning-Of-Tape marker (BOT) shall be adjacent to the reference edge, and the End-Of-Tape marker (EOT) shall be adjacent to the opposite edge.

The width of the markers shall be 4,8 mm $\pm$ 0,4 mm, their length 28 mm $\pm$ 5 mm and their thickness when measured after their application on the tape shall not exceed 0,020 mm.

The Beginning-Of-Tape marker (BOT) shall be placed 4,9 $\pm$ 0,6 m from the beginning of the tape and the End-Of-Tape marker (EOT) shall be placed 7,6 m (+ 1,5 m, - 0 m) from the end of the tape.

The surface of the reflective marker shall be non-conductive.

9.10 End of the Tape

Experience has shown that under some circumstances it is difficult to detach the end of tape from the pack in a cartridge, i.e. the end of tape remains with the pack. It has been found helpful to form the tape end to permit air to get under it, thus allowing it to lift off. It is therefore recommended that the tape end be trimmed to a regular shape and crimped longitudinally up to a maximum of 13 mm from the tape end.

10. REEL

10.1 Construction

10.1.1 Reels shall be constructed such, that any cross-section taken through the central axis of the reel conforms to Fig. 7 except where taken so as to pass through the relieved portion of the write-enable ring groove. The section shall, in this case, conform to Fig. 7 with appropriate deviations permitted at the ring groove relief as illustrated in Section Z-Z in Fig. 7.

10.1.2 Reels shall not be symmetrical, the flange differing primarily as to the presence or absence of the write-enable ring, which shall be adjacent to the mounting pedestal for correct machine operation.

10.1.3 Hub and flanges need not to be integral, but may be separate parts at the manufacturer's option as long as all other requirements of this Standard are met.

10.1.4 All dimensions shown in Fig. 7, including those in detail sections, shall be held to the tolerances specified in the Table of page 14.

10.1.5 The reference surface for reel mounting shall be the circular surfaces defined by the circumferences of diameters A and D on the rear flange.

10.1.6 The outside cylindrical surface of the hub shall be concentric with the bore (dimensions C and A respectively of Fig. 7) within 0,25 mm.

10.1.7 Bosses, ribs or raised designs are permitted on the outside surfaces of the flanges, provided that they do not extend beyond the cross-hatched envelope of Fig. 7.

10.2 Balance

The full reel shall be balanced about its normal axis of rotation. Any amount by which the full reel is out of static balance shall not exceed 0,015 g.m.

	Nominal	Tolerance
A	93,68	+0,13 -0,08
B	266,70	+0,25 -0,75
C	130,18	(N) ±0,20 (W) ±0,13
D	98,42	±0,13
E	111,46	±0,13
F	6,35	+0,25 -0
H	19,05	±0,38
J_f	15,80	+0,64 -0,13
J_r	2,46	+0,13 -0,64
K_f	3,18	maximum
K_r	2,03	maximum
L	104,78	minimum
M	18,24	±0,13
N	1,5	
R	42,60	±0,25
α	4^o	±15'
R_o	0,38	minimum
R_i	0,89	minimum
S_r	0,76	maximum
S_f	19,12	maximum
T	0,77	minimum

10.3 Moment of Inertia

The moment of inertia of the full reel shall not exceed 10,5 $g.m^2$. The maximum moment of inertia of an empty reel shall not exceed 2,75 $g.m^2$.

10.4 Rigidity of the Hub

Dimension A shall not be reduced to less than 93,5 mm when the reel is fully loaded with tape wound at a constant tension of 3,6 N.

10.5 Owner Identification

A labelling area shall be provided on the front flange of the reel for ownership identification.

10.6 Manufacturer's Reel Identification

The manufacturer's identification may be placed on the reel.

10.7 Interchange Label

A labelling area shall be provided on the front flange. Suitable labels shall be used for marking the contents of the reel of tape. Adhesive labels, if employed, shall be of a type which leave no residue when removed. The use of pencil or similar erasable marking is not allowed.

10.8 Write-Enable Ring

10.8.1 When installed in the write-enable ring groove, the top surface of the write-enable ring shall not protrude above the mounting reference surface.

10.8.2 All write-enable rings shall have a tab to facilitate removal from the groove.

10.8.3 Dimensions and materials used shall be such that the write-enable ring may be inserted and removed with reasonable effort and remains inserted during normal use. Furthermore, the ring shall be constructed so as not to interfere with normal tape transport performance.

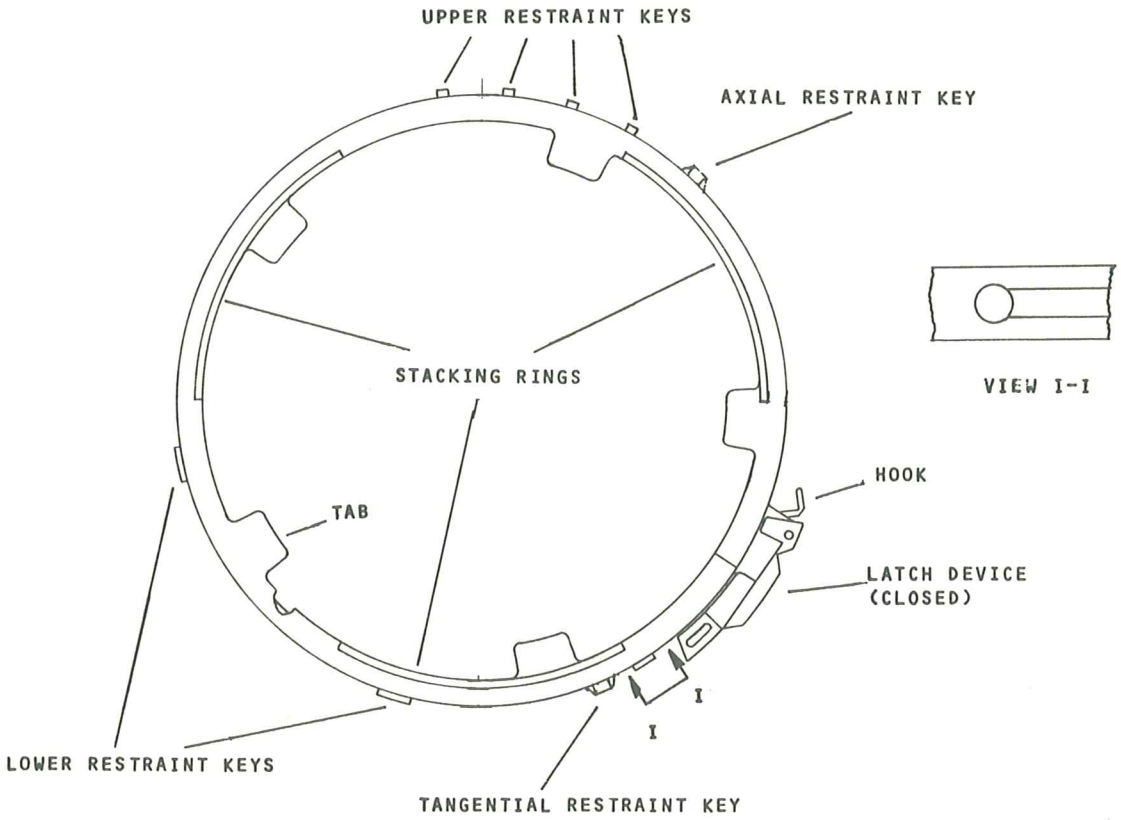


Fig. 1 Closed Position
(back side)

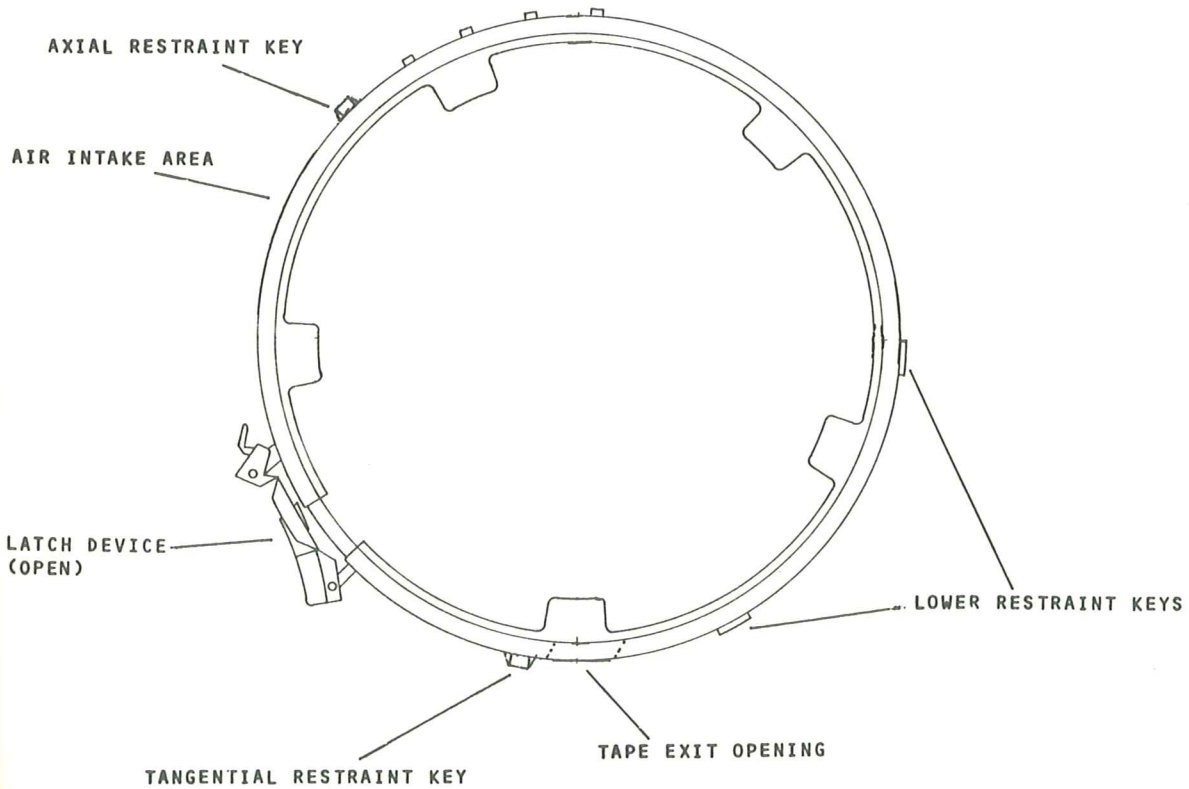


Fig. 2 Open Position
(front side)

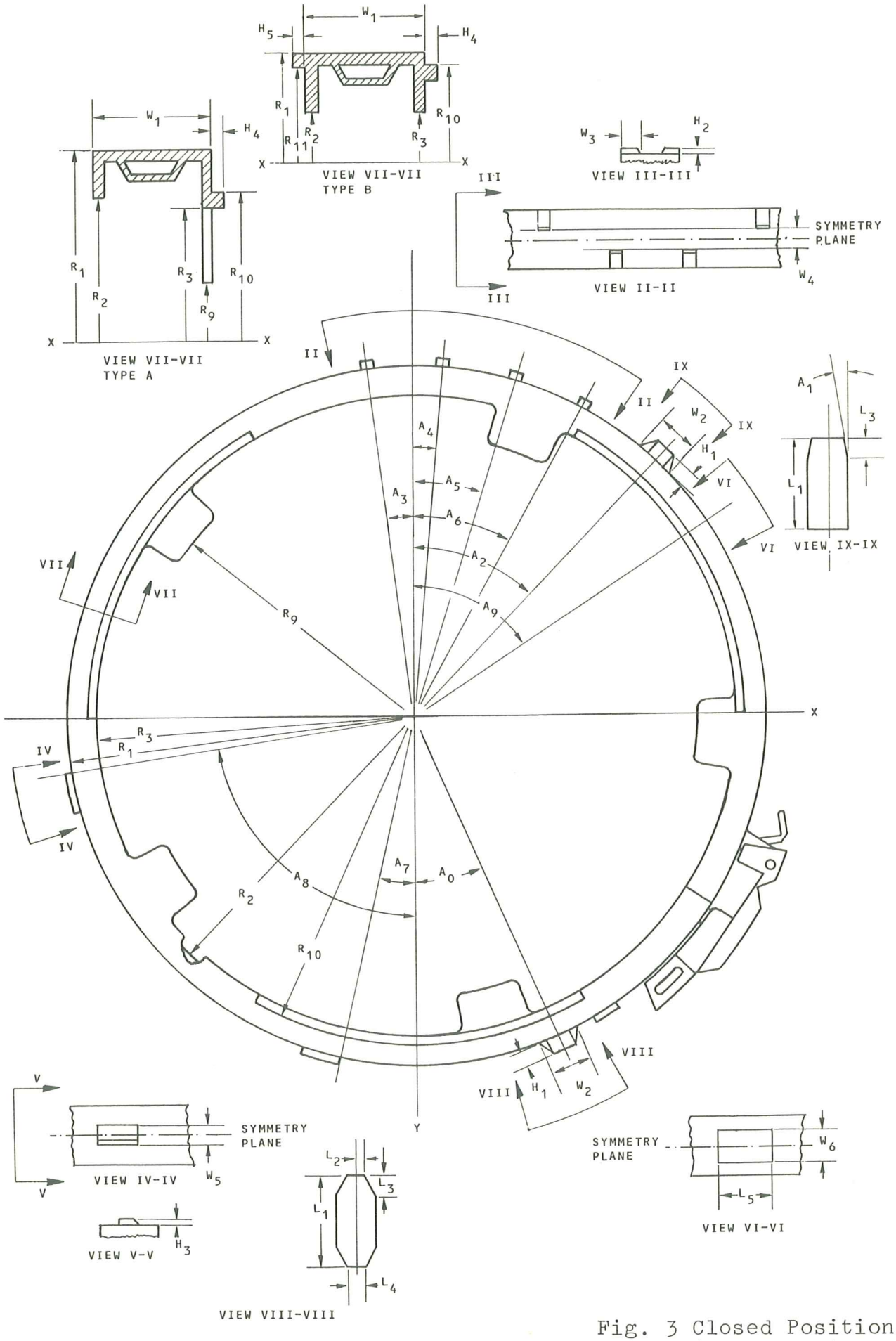


Fig. 3 Closed Position
(back side)

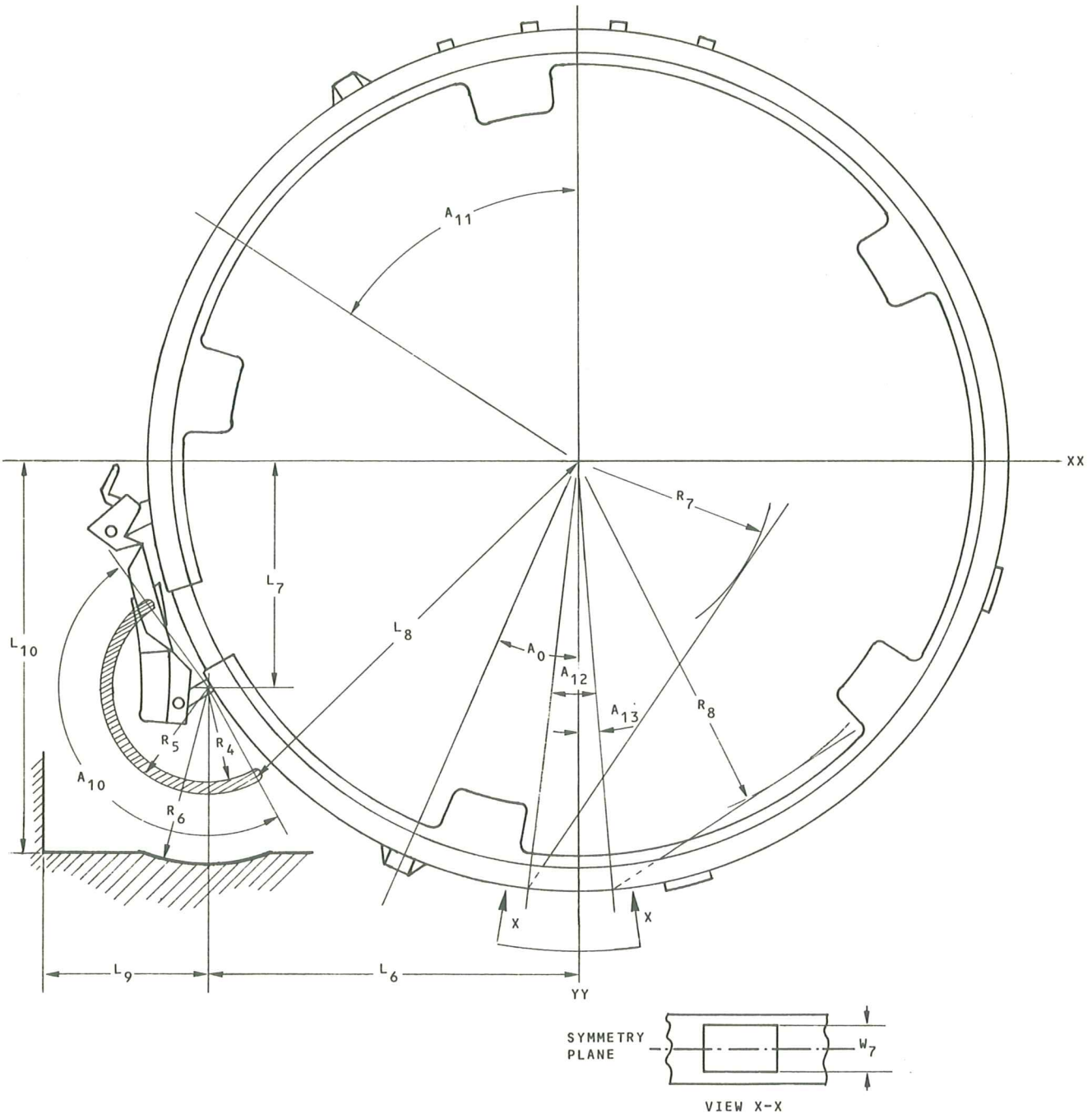


Fig. 4 Open Position (front side)

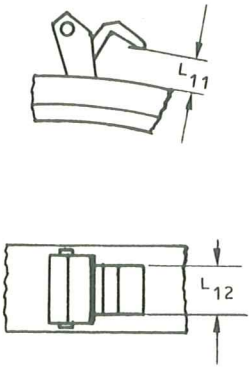


Fig. 5 Hook

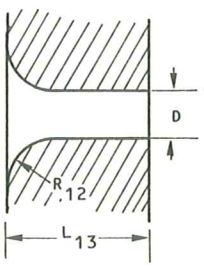
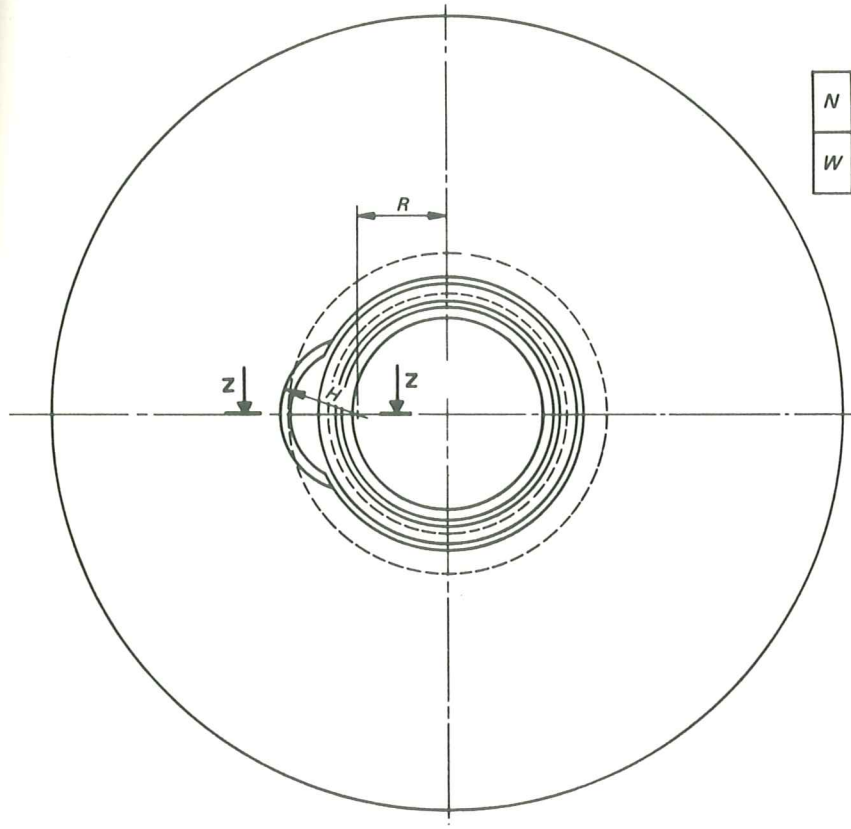
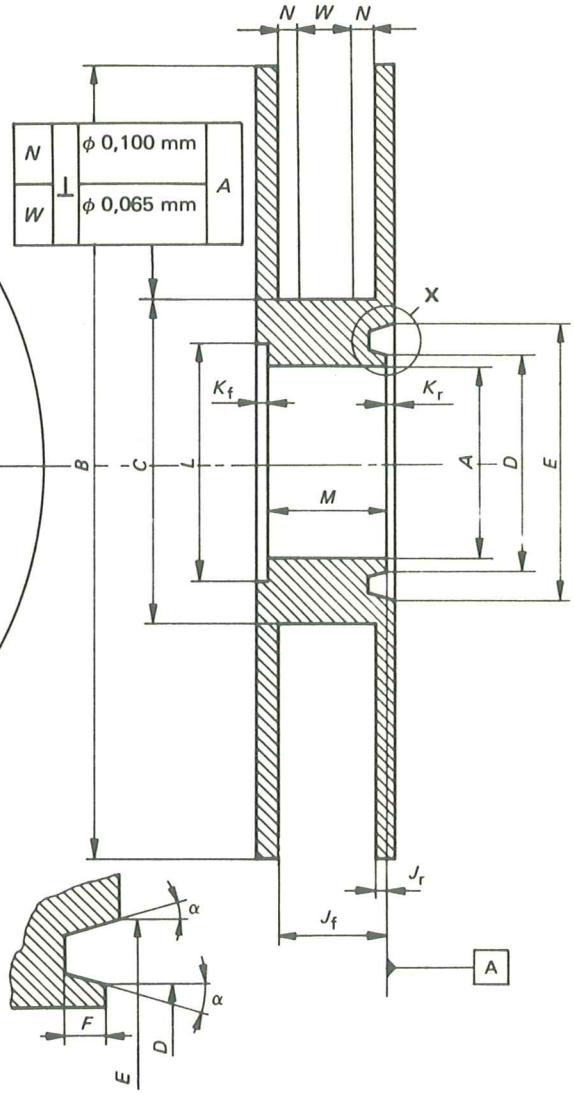


Fig. 6 Reference Orifice



Rear Flange View

Section Z-Z



Detail X

Sectional View
(Tolerancing Envelope)

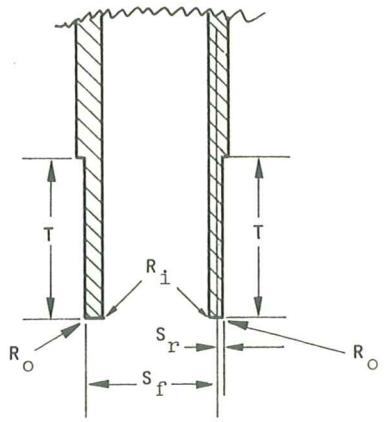


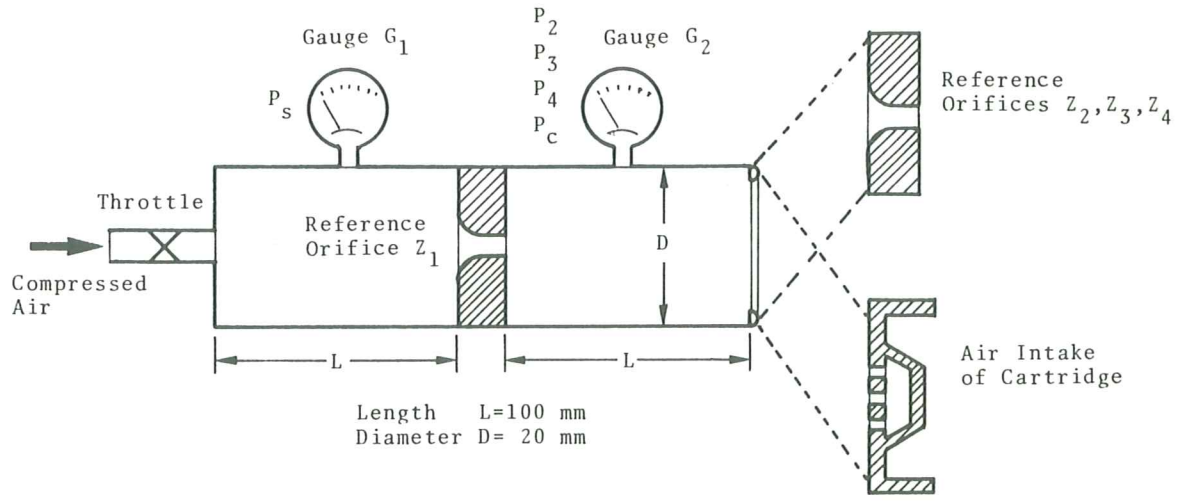
Fig. 7 Reel

APPENDIX

Instrumentation for Measuring the Pneumatic Impedance

Since it is the relative impedance which is of interest, there is no need for precision instruments reading absolute values. Pneumatic impedance is related to differential pressure and resulting air flow, and relative air flow in turn can be measured by measuring relative pressure differential across a fixed impedance.

The test set-up shown below consists of a tube, a throttle, Reference Orifice Z_1 and two pressure gauges G_1, G_2. Compressed air is applied to one end of the tube. The throttle is used to adjust the air flow through the tube. The other end of the tube is then applied to each of the Reference Orifices Z_2, Z_3, Z_4 and to the air intake area of the empty cartridge under test. The tube is divided into two sections by Reference Orifice Z_1. A pressure gauge is connected to each section.



TEST PROCEDURE

All readings are made with an accurancy of 1% of the full scale.

i) The test tube is applied to Reference Orifice Z_4. The throttle is adjusted until gauge G_2 reads a pressure

$$P_4 = 5,98 \text{ kPa} \pm 0,06 \text{ kPa}$$

The reading P_S of Gauge G_1 is noted.

ii) The throttle remains then in its position until the end of the test procedure.

iii) The test tube is applied to Reference Orifice R_2. The reading P_2 of Gauge G_2 is noted.

iv) The test tube is applied to Reference Orifice Z_3. The reading P_3 of Gauge G_2 is noted.

v) The test tube is applied to the air intake area of the cartridge under test. The reading P_c of Gauge G_1 is noted.

vi) The test tube is applied again to Reference Orifice Z_4. The reading P_S of Gauge G_1 and P_4 of Gauge G_2 must be the same as in step i) above.

RESULT

The cartridge under test complies with clause 8.2.3 of the Standard if

$$P_2 \leqslant P_c \leqslant P_3$$