

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Packaging of components for automatic handling –
Part 4: Stick magazines for electronic components encapsulated in packages of
different forms**

**Emballage des composants pour opérations automatisées –
Partie 4: Magasins chargeurs pour composants électroniques encapsulés dans
des boîtiers de différentes formes**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**Part 4: Stick magazines for electronic components encapsulated
in packages of different forms**

FOREWORD

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International Standard IEC 60286-4 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This third edition cancels and replaces the second edition published in 1997 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- Clause 4 describes the guidelines for customer specific stick magazine design. It replaces the magazine design rules for IEC outlined components and rules for orientation of components in stick magazines which have been moved to Annexes A to D.

The text of this standard is based on the following documents:

FDIS	Report on voting
40/2230/FDIS	40/2241/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60286 series, published under the general title *Packaging of components for automatic handling*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 4: Stick magazines for electronic components encapsulated in packages of different forms

1 Scope

This part of IEC 60286 is applicable to stick magazines (including end stoppers) intended to be used for storage of electronic components, for transport from the manufacturer to the customer and for in-house use in the manufacturing plant. They are also used to feed automatic placement machines for surface mounting as well as for through-hole mounting of electronic components.

2 Normative references

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

IEC 60191-3:1999, *Mechanical standardization of semiconductor devices – Part 3: General rules for the preparation of outline drawings of integrated circuits*

IEC 60747-1:2006, *Semiconductor devices – Part 1: General*
Amendment 1:2010

3 Terms, definitions and conventions

3.1 Terms and definitions

For the purposes of this document, the following definitions apply.

3.1.1

stick magazine

elongated container which has an appropriate cross section designed to accommodate devices

Note 1 to entry: Alternative terms such as tube, rail and magazine may be used.

3.1.2

end stoppers

mechanism placed at each end of the stick magazine to keep the devices from falling out of the stick magazine

Note 1 to entry: Alternative terms such as pins, plugs, end plugs, nails, retainers etc. may be used, but for the purposes of this standard "end stopper" shall be used.

3.2 Conventions

All dimensions in tables and figures representing sizes are in millimetres. All dimensions in tables and figures representing angles or radii are in degrees.

4 Shape and cross-section of stick magazine

Examples of typical and customized cross-sections for stick magazines are given in Figure 1.

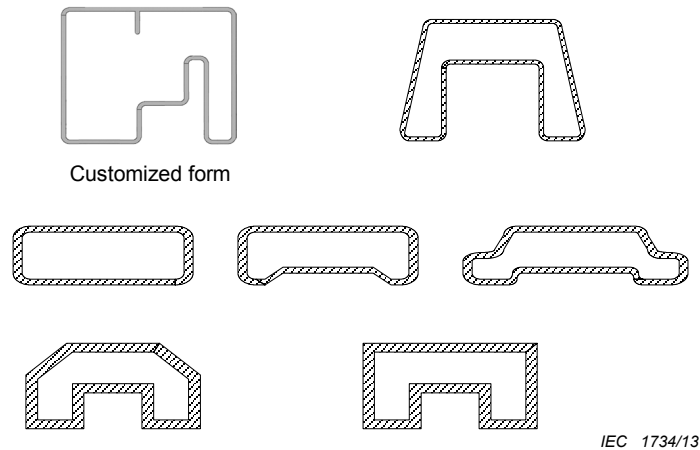


Figure 1 – Shape and cross-sections of stick magazines

Internal stick magazine configuration shall be such that the individual component is protected from damage, maintains a fixed orientation and slides freely when one end is elevated at a minimum angle of 30°.

As magazine material over time is changing, the level of elevation of 30° may not be sufficient for freely sliding of components. In this case, to allow proper transition of the component from the magazine to a horizontal surface, the level of elevation should be kept to a minimum.

5 Dimensions of stick magazines

5.1 General

Because the shape of the cross-section varies, the controlled distance tolerances should conform to the values in Table 1, Table 2 and Figure 2. This table provides the tolerances to the package profile dimensions, which is a summary of the tolerances for various standard outlines (see Annexes A, B and C).

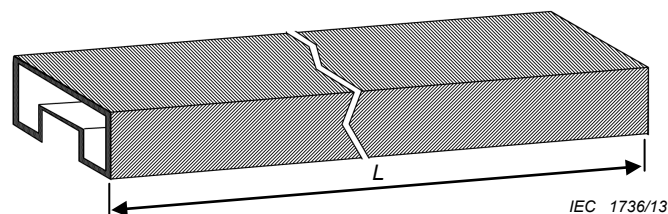
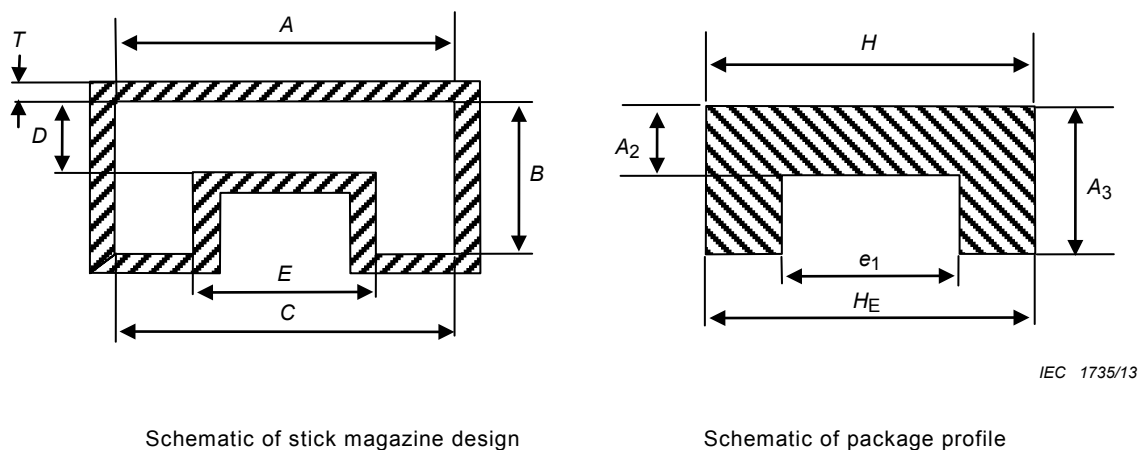


Figure 2 – Schematic of stick magazine design and schematic of package profile

Table 1 – Tolerances to the package profile dimensions

Functional cross reference		Tolerances to package profile dimensions
Stick magazine	Package profile	
A	H	Package dimension $\begin{smallmatrix} +0,5 \\ -0,0 \end{smallmatrix}$
B	A ₃	
C	H _E	
D	A ₂	Package dimension $\pm 0,2$
E	e ₁	
NOTE 1 A ₂ is the body height of the component.		
NOTE 2 A ₃ is the total package height of the component.		

NOTE Additional protection of the component can be given by individual design to prevent cross traversing to the stick magazine length (prevention of bend leads).

Table 2 – Principle of stick magazine requirements

Dimension	Nominal value and tolerances
<i>All radii</i>	0,5° to 1,5°
<i>L</i>	530 mm max.
<i>T</i>	0,6 mm –0,15 / +0,2

5.2 Materials

The material shall be conductive, static dissipative or antistatic (a measuring method and requirements are under consideration).

The loaded magazines shall be suitable to withstand transport and storage without danger of giving off vapours or of contaminating the surface of the terminations, which could make soldering difficult or deteriorate the component properties or terminations by chemical action.

As a minimum, the component device type, manufacturer's name or trade mark and date code shall be legible without removal of the components from the stick magazine. Where the stick material is not transparent, a suitable window or a series of windows/holes shall be provided for inspection purposes.

5.3 Recycling

Stick magazines should be made of recyclable material. When such material is used the magazine shall be permanently marked with the recycling symbol.

The end-stoppers should be of the same material as the stick magazine. This does not apply to PVC-free type stick magazines, see Table 3.

Table 3 – Material reference for magazines and stoppers

Magazine type	Magazine material	Stopper material
PVC type	PVC (hard type)	PVC (soft type)
PVC free type	PVC free (e.g. PC or PET)	PVC free (e.g. Elastomer (thermoplastic))

ISO 11469 should be used.

6 Mechanical stability

The mechanical stability of a loaded magazine during storage, transport and use shall be such that the components are adequately retained, without deformation of the terminations or other damage, in order to maintain their orientation within the magazine, yet enabling them to be easily removed.

The magazine, which should not exceed 530 mm in length, shall also be suitable for use with automatic placement machines or test equipment, and should be capable of bending in the length axis through a radius of 600 mm. They shall be so designed that they can be stacked in the machines and shall not overturn.

7 End stoppers and spacers

End stoppers may be used to close the ends of the stick magazines, and spacers may be used to limit the movement of the components within the stick magazines.

For end stoppers and spacers the following rules apply:

- a) They shall be of any suitable material, preferably recyclable. When such a material is used and size permits, end stoppers and spacers shall be marked with the recycling symbol.
- b) They shall be of static dissipative or antistatically-coated material, and spacers shall be of adequate compliance to prevent component damage.
- c) End stoppers shall stay in place at the ends of the magazines until they are intentionally removed, and shall be easily removable to disperse the devices without damaging the stick magazines.

8 Orientation of the components in the stick magazine

See IEC 60191-3:1999, Annex G.

Rule (see also Annex D).

Integrated circuit packages shall be put in stick magazines with the terminal No. 1 mark orientation. The side with the mark has to exit first from the carrier.

When the packages are in the carrier and viewed from the top, the terminal No. 1 mark shall be left or in the lower left corner, and component marking shall be readable from the left to right.

9 Marking

The magazines shall be marked "Dissipative" or "Antistatic" as applicable.

The direction of unloading shall be marked on the magazines.

If the components are electrostatically sensitive and require special precautions during handling, the magazines shall also be marked as required in Clause 8 of IEC 60747-1:2006, Amendment 1:2010.