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Edition 3.1 2021-04
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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Packaging of components for automatic handling – Part 1: Tape packaging of components with axial leads on continuous tapes

Emballage des composants pour opérations automatisées – Partie 1: Mise en bande des composants à sorties axiales en bandes continues

IEC 60286-1:2017-07+AMD1:2021-04 CSV(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 1: Tape packaging of components with axial leads on continuous tapes

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IEC 60286-1 edition 3.1 contains the third edition (2017-07) [documents 40/2538/FDIS and 40/2552/RVD] and its amendment 1 (2021-04) [documents 40/2822/FDIS and 40/2831/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60286-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This third edition constitutes a technical revision.

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

a) a complete revision of the structure (detailed in Annex A) and reworked layout.

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

A list of all parts of the IEC 60286 series, 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 the base publication and its amendment 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- withdrawn,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.

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PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 1: Tape packaging of components with axial leads on continuous tapes

1 Scope

This part of IEC 60286 applies to the tape packaging of components with axial leads for use in electronic equipment. In general, the tape is applied to the component leads.

It covers requirements for taping techniques used with equipment for the preforming of leads, automatic handling, insertion and other operations, and includes only those dimensions which are essential to the taping of components intended for the above-mentioned purposes.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60294, *Measurement of the dimensions of a cylindrical component with axial terminations*

ISO 11469, *Plastics – Generic identification and marking of plastic products*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

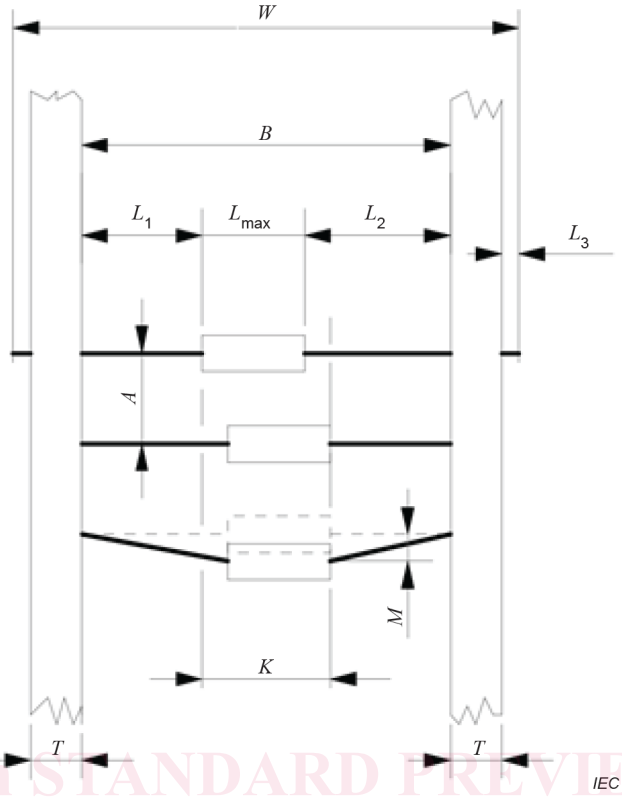
- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Dimensions

4.1 Dimensions common to tapes and taped components with axial leads

4.1.1 General

The general configuration is shown in Figure 1, Table 1 and Table 2.



Key

A is the distance between adjacent components in tape.

B Is the Inner distance between two tapes.

K is the allowed displacement distance of component in tape.

L_1 is lead length between component body and inner side of tape on left side.

L_2 is lead length between component body and inner side of tape on right side.

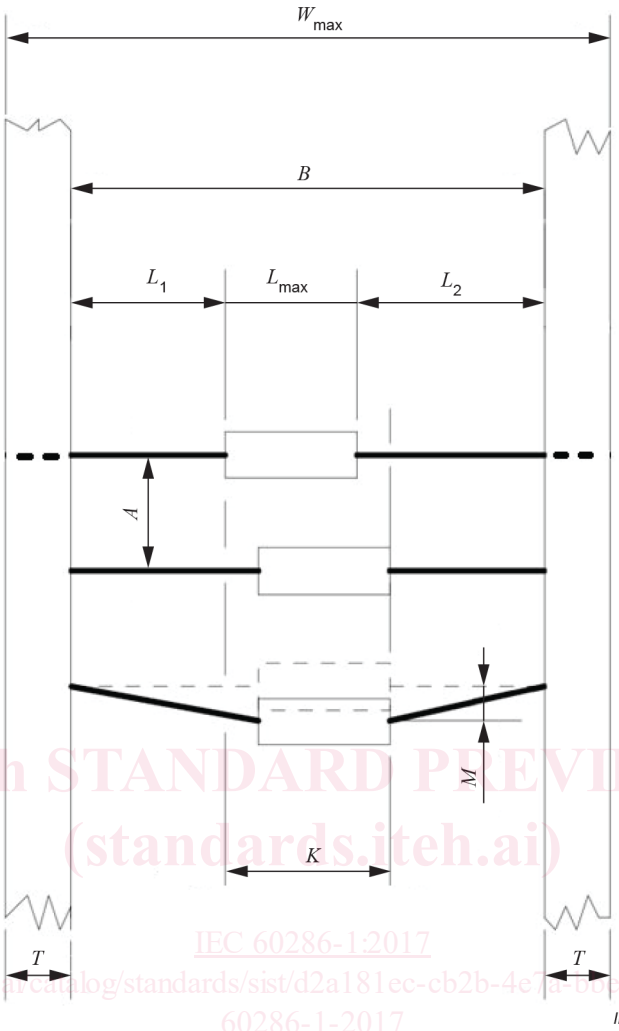
L_3 is the part of lead protruded outside the tape.

L_{max} is the body length of the component.

M is the max allowed distance of displacement.

T is the width of the tape.

W is the maximum allowed total distance of the component after protrusion of leads outside of the tape.



Key

A	is the distance between adjacent components in tape.
B	is the inner distance between two tapes.
K	is the allowed displacement distance of component in tape.
L_1	is the lead length between component body and inner side of tape on left side.
L_2	is the lead length between component body and inner side of tape on right side.
L_{max}	is the body length of the component.
M	is the maximum allowed distance of displacement.
T	is the width of the tape.
W_{max}	is the maximum outer distance allowed between the two tapes.

Figure 1 – Dimensions for tape packaging of components with axial leads

Table 1 – Tape widths and permissible variation

Nominal widths of tape *T* mm	Permissible variation in width mm
6	±1
9	±1

Table 2 – Component spacing and permissible deviation

Standard spacing between components *A* mm	Permissible cumulative deviation over ten spacing *P* mm
5 ± 0,5	±2
10 ± 0,5	±2
15 ± 0,5	±2
20 ± 0,5	±2

4.1.2 Body location (permissible lateral deviation)

Dimension K, being the width of the window in which the component body shall be located, shall be 1,0 mm (for B = 26 mm) or 1,4 mm (for B > 26 mm) wider than the maximum length L_{max} of the component body. The latter is the body length measured in accordance with IEC 60294.

Unless otherwise specified, the window shall be centrally located between the tapes.

When a gauge measurement to determine dimension K is impractical, it is possible to measure the distances L_1 and L_2 of the leads. The difference between L_1 and L_2 shall not exceed 1,0 mm (for B = 26 mm) or 1,4 mm (for B > 26 mm).

4.1.3 Tape spacing

~~The maximum overall width W, including any lead protrusion L_3, shall not exceed 140 mm. Its value shall be chosen in relation to the component dimensions.~~

The maximum overall width W_{max} shall not exceed 140 mm. Its value shall be chosen in relation to the component dimensions.

The tape spacing given in Table 3 is recommended.

Table 3 – Tape spacing

Inside tape spacing B mm
$26^{+1,5}_{0}$
52^{+2}_{-1}
63 ± 2
73 ± 2
83 ± 2
93 ± 2
Inside tape spacing B above 93 mm to be in 10 mm increments with a tolerance ±2 mm as long as the maximum overall width ~~W~~ W_{max} of 140 mm is not exceeded.

4.2 Taping

4.2.1 General

The following requirements for axial components shall be met as appropriate (see Figure 1).

4.2.2 Orientation of polarized components

All polarized components shall be oriented in one direction; the polarized components shall be clearly identified by use of different colours or marked tapes, the anode being of a white or neutral colour.

4.2.3 Position, kinks and bends of the leads

The position, kinks and bends of the leads are as follows.

a) The leads shall be free from kinks and bends.

b) The method used to position the component leads on the tape shall be such that the leads are not nicked or otherwise damaged.

c) Leads shall not be bent beyond 1,0 mm (for B = 26 mm) or 1,2 mm (for B > 26 mm) from their nominal position when measured from the leading edge of the component lead at the inside tape edge and at the lead egress from the component (see dimension M in Figure 1).

4.2.4 ~~The ends of the leads~~ Lead protrusion

The ends of the leads shall not protrude beyond the tapes.

4.2.5 Holding in the tape

The components shall be held sufficiently in the tape(s) so that they cannot come free during normal handling.

4.2.6 Requirements of tape material, storage, and handling

The tapes shall be suitable to withstand storage of the taped components. The tape material shall not migrate along the leads or give off vapours that can affect solderability or deteriorate the component properties or leads by chemical action (e.g. corrosion).

In addition, the tapes shall not become detached, thereby causing the components to lose their relative position after storage, and the tape shall not age to such an extent that its strength is reduced, causing it to break either when the components are unreeled manually or by an assembly machine.

Tapes in adjacent layers shall not stick together in the packing, because of the exposed adhesive for instance.

4.2.7 Splices of tape

Splices shall be at least as strong as the original tape and shall not be thicker than four times the thickness of a single layer of the original tape. Splices shall not be misaligned by more than 0,8 mm. When splicing is applied, component spacing A shall remain within the tolerances as specified in Table 2.

4.2.8 Leader tape

~~A twin leader tape, free of components, having a minimum length of 200 mm shall be provided at the beginning and at the end of the tape.~~

Unless otherwise specified by agreement between the manufacturer and the customer, reel package should have leader tapes without components for at least 200 mm at leader part and trailer part. The leader tapes shall not be required for fan-fold package. Depending on the customer's request, fan-fold package may have leader tapes without components for at least 200 mm at leader part and trailer part.

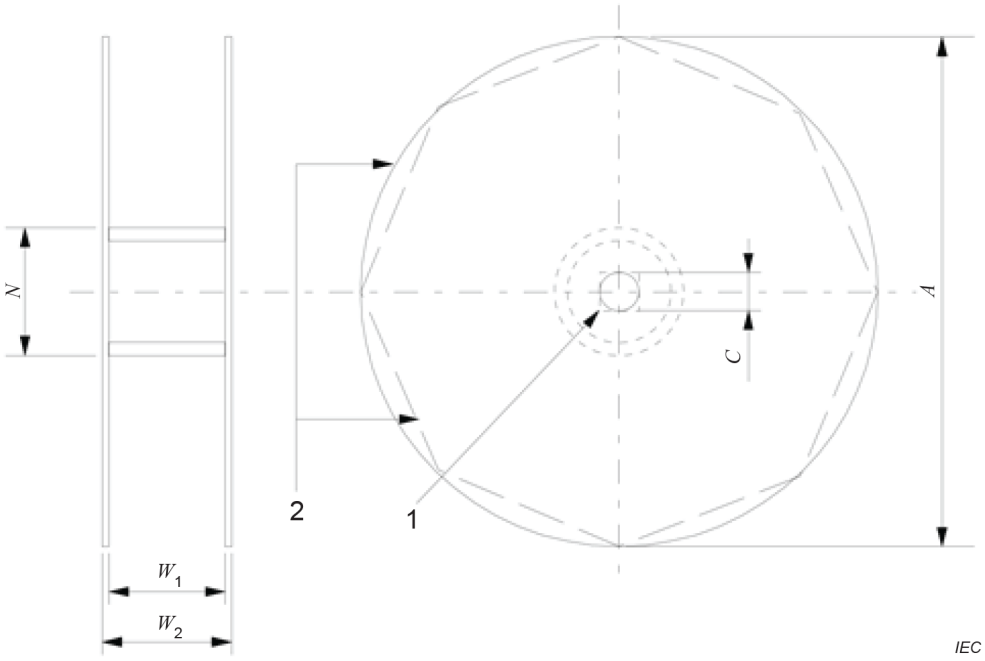
5 Packing

5.1 General

The tapes of components may either be wound on reels or fan-folded.

5.2 Dimensions of the reel

The preferred reel dimensions are shown in Figure 2.



Key

1 is the optional shape: circular or square.

2 is the optional shape: circular or polygonal.

A is the reel diameter: maximum 400 mm.

C is the arbor hole diameter: 14 mm to 38 mm.

N is the hub diameter: 34,9 mm to 102 mm.

Figure 2 – Reel dimensions

5.3 Distances W_1 and W_2

The distances W_1 and W_2 shall be governed by the overall width of the taped components ~~W~~ W_{max} (see Figure 1) and shall allow proper reeling and unreeling.

5.4 Recycling

Reels as defined in Figure 2 should be made of recyclable material. When such material is used, the reel shall be permanently marked with the recycling symbol.

ISO 11469 should be used for making the material.

5.5 Protection of components

In order to prevent component damage and lead distortion, protection between layers of components and over the last layer may be necessary. In this case, protection materials shall not cause deterioration of the component or of lead solderability.

5.6 Reel filling

The total number of components on the reel shall be such that the components and the final cover shall not extend beyond the smallest dimension of the flange in the radial direction.

5.7 Dimensions of the fan-fold container

The preferred outer dimensions of a fan-fold arrangement are shown in Figure 3.