

TECHNICAL REPORT



**Packaging of components for automatic handling –
Part 3-4: Packaging of surface mount components on continuous embossed
tapes for Auto Loading Feeder**

IEC TR 60286-3-4:2021

<https://standards.iteh.ai/catalog/standards/sist/e980b586-de99-4cc6-b904-ca7d486be581/iec-tr-60286-3-4-2021>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**Part 3-4: Packaging of surface mount components
on continuous embossed tapes for Auto Loading Feeder**

FOREWORD

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IEC TR 60286-3-4 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
40/2844/DTR	40/2866/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available

at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
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INTRODUCTION

This Technical Report was developed by the technical committee 40 working group 36 on components packaging, in which the members, such as mounter manufacturers, component manufacturers and packaging material manufacturers, had proposed, considered and discussed the possible standardization of the application of Auto Loading Feeder to enable automatically exchange SMD continuous tapes, using paper carrier tape during mounter operation, aiming to support IEC 60286-3, Edition 6, issued in 2019.

This document includes data expressed in the form of provisions, such as requirements or recommendations. These data, however, do not claim to be provisions and are just suggested as the results of the discussion.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a trademark concerning Auto Loading Feeder given in 3.1.1.

- Trademark ... AUTO LOADING FEEDER™
- Trademark registration number ... No.5983611 (Japan)

IEC takes no position concerning the evidence, validity and scope of this trademark right.

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PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 3-4: Packaging of surface mount components on continuous embossed tapes for Auto Loading Feeder

1 Scope

This part of IEC 60286 considers the proposed requirements for emboss taping for the Auto Loading Feeder mechanism to mount electric components without leads or with stump type leads used for electric circuits. This document is applicable to the embossed carrier tape, with single round sprocket holes, with tape pitches of 2 mm or more (nominal tape width: 8 mm only) among the tapes of Type 2a in IEC 60286-3.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes the statement 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 60286-3:2019, *Packaging of components for automatic handling – Part 3: Packaging of surface mount components on continuous tapes*

3 Terms, definitions and symbols

IEC TR 60286-3-4:2021
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3.1 Terms and definitions

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

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>

NOTE Annex B features a Glossary of mounter and feeder related terms.

3.1.1

Auto Loading Feeder

AUTO LOADING FEEDER™

tape feeder that can keep supplying components by automatically carrying a tape of re-supplied SMD at the filling-in position into the components supply position, just after the components in the tape of previously supplied SMD are fed up during the assembly production

Note 1 to entry: Auto Loading Feeder has the mechanism that the cover tape of a SMD tape is automatically cut or peeled off to expose the pockets during the operation to supply components.

3.1.2

seal

bonding of a part of the top cover tape and a part of the carrier tape

Note 1 to entry: The top cover tapes are classified as heat welding type and adhesive type by the way to bond itself on the carrier tape.

3.1.3

cross-bar

section between openings of the pockets adjacent to each other in the direction of pulling out an embossed carrier tape

3.2 Symbols

The symbols used in this document are shown in Table 1 and Figure 1.

Table 1 – Symbols used in figures and tables

Symbol	Description	Figures and tables using the symbol
B_0	Cross-tape dimension of the bottom surface of a pocket	Figure 1, Table 2, Table 3 and Figure 8
B_1	Cross-tape dimension of the opening of a pocket	Figure 1 and Figure 8
M_1	Distance between the reference point of the sprocket holes (centre) and the inner side of the seal on the upper end side, which is near the sprocket holes, of the carrier tape	Figure 1 and Table 2
M_2	Distance between the reference point of the sprocket holes (centre) and the inner side of the seal on the lower end side, which is far from the sprocket holes, of carrier tape	Figure 1 and Table 2
K_1	Distance between the upper side of the carrier tape and the top surface of a component	Figure 1 and Table 3
K_2	Distance between the upper side of the carrier tape and the upper side of the recessed part in a cross-bar section	Figure 1, Figure 3 and Table 3
K_3	Distance between the upper side of the recessed part in a cross-bar section and the top surface of a component	Figure 1, Figure 3 and Table 3

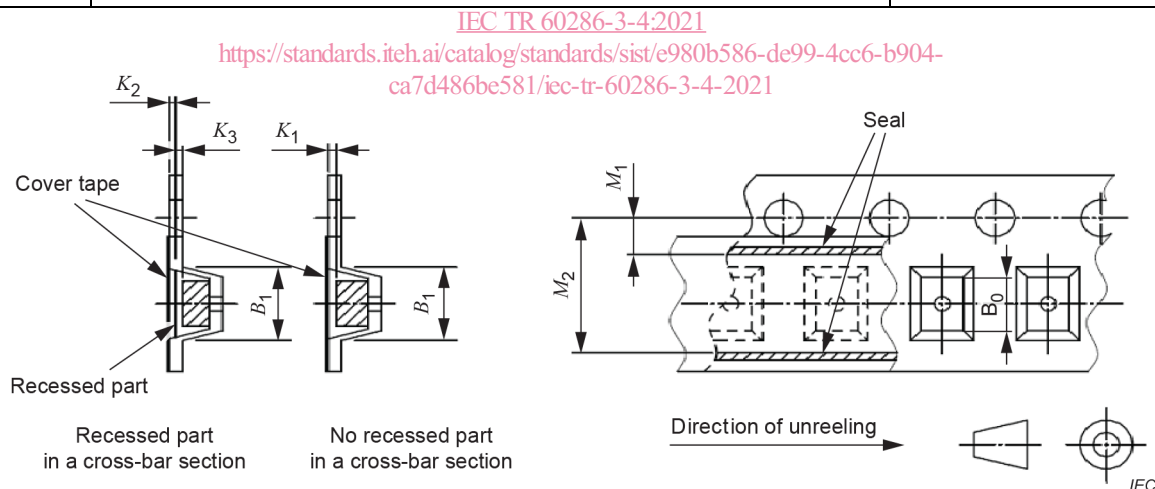


Figure 1 – Specified dimensions for emboss taping for Auto Loading Feeder

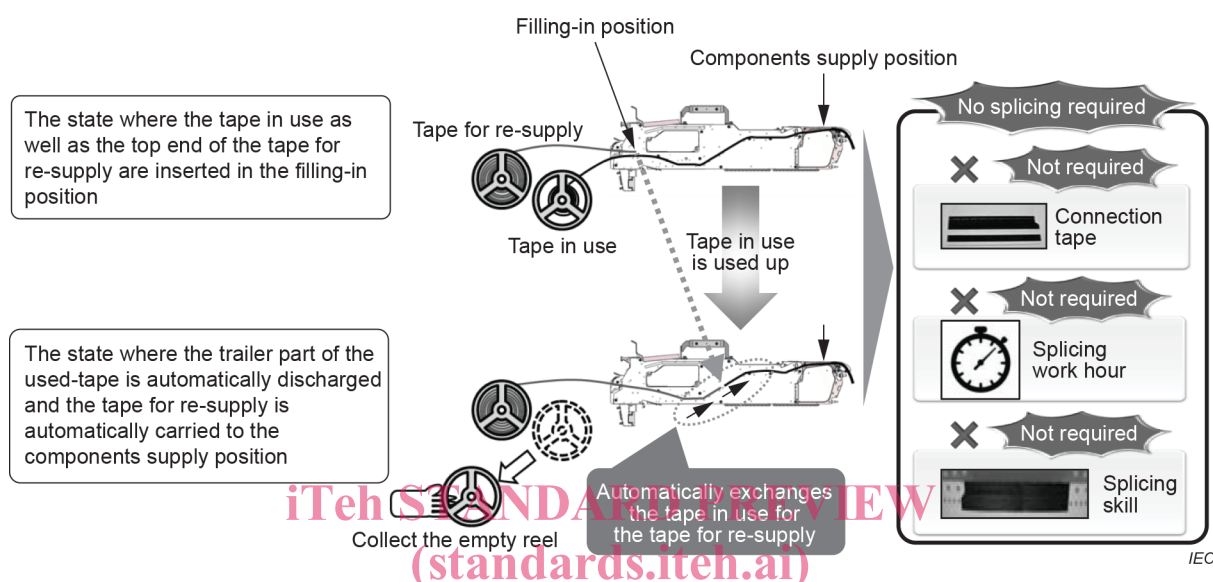
4 Overview of Auto Loading Feeder

4.1 Overview and features of Auto Loading Feeder

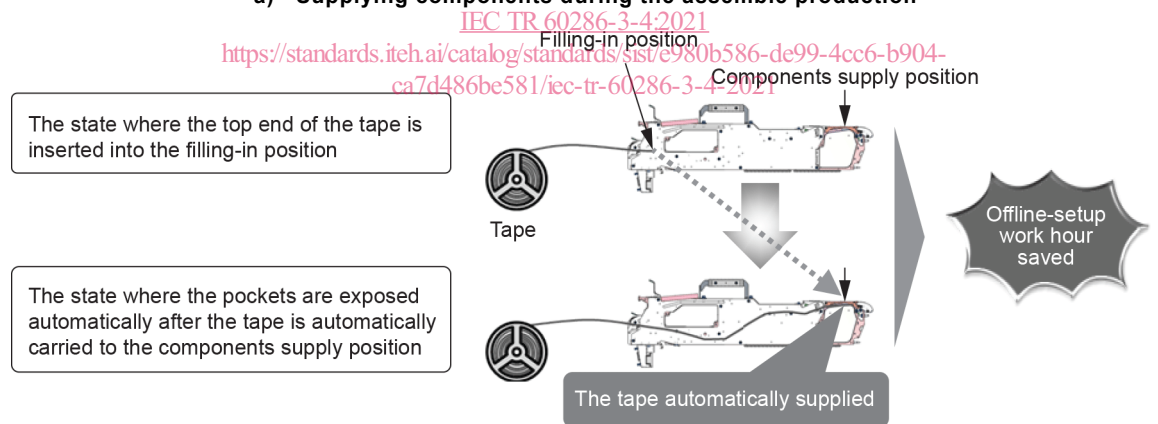
A characteristic example for operation of an Auto Loading Feeder is shown in Figure 2. Just after the components in a SMD tape get used up in the mounting process, another tape for re-supply set at the filling-in position is automatically carried to the components supply position and the pockets are automatically exposed. That results in re-supplying the components automatically. That is to say, this mechanism enables to keep supplying components without the conventional splicing work using a connection tape, which requires man-hours and specific

skills. In addition, it enables to largely reduce work hours during the work at offline setup, because just inserting the top end of the tape in the re-supply position enables to supply the tape automatically in the same way as during supplying components in the mounting process. Auto Loading Feeder enables to boost up operating rate of mounters, save man-power and resource in the components mounting field of electrical and electronic manufactures, and is expected to get more popularization as the next generation supply system.

NOTE The splicing work is to connect the cut-off end of the trailer part of an in-use SMD tape and the cut-off tip of the leader part of a SMD tape for re-supply, by using a connection tape.



a) Supplying components during the assemble production



b) Supplying tape at offline setup

Figure 2 – Operation and features when another tape is re-supplied automatically by the Auto Loading Feeder

4.2 Methods and mechanisms of automatically exposing the pockets in using Auto Loading Feeder

The methods and mechanisms of automatically exposing the pockets in using Auto Loading Feeder are classified as follows. See Annex A for details.

- The single-door method with which only one sealed side of the cover tape is peeled off to expose the pockets (see Clause A.2);
- The double-door method with which the centre of the cover tape is cut in to expose the pockets (see Clause A.3).

IEC 60286-3 describes some requirements provided that the cover tape should be peeled off and removed. Auto Loading Feeder mechanism, however, needs other requirements about the sealed position of the cover tape on the carrier tape in order to maintain its stable operation since the mechanism leaves the cover tape on the carrier tape.

5 Discussion items for requirements for emboss taping for Auto Loading Feeder

5.1 General

New requirements for emboss taping for Auto Loading Feeder are to be considered in addition to the requirements for the embossed carrier tape, with single round sprocket holes, with tape pitches of 2 mm or more (nominal tape width: 8 mm only) among the tapes of Type 2a in IEC 60286-3:

- a) Required dimensions for the cover tape sealed positions (see 5.2);
- b) Required dimensions for the distance between the upper side of the carrier tape and the top surface of a component (see 5.3);
- c) Necessity of M_1 and M_2 as the cover tape sealed positions (see 5.4);
- d) Necessity of K_1 as the distance between the upper side of the carrier tape and the top surface of a component (see 5.5);
- e) Necessity of K_2 as the recessed part in a cross-bar section (see 5.6);
- f) Necessity of K_3 as the distance between the upper side of the recessed part in a cross-bar section and the top surface of a component (see 5.7);
- g) Sealing method for the cover tape (see 5.8);
- h) Dent of the cover tape over the pockets (see 5.9);
- i) Lower limit of the cover tape peel-off strength (see 5.10);
- j) Adhesion of components on the cover tape (see 5.11);
- k) Hole of the bottom of the pockets of the carrier tape (see 5.12);
- l) Maximum length of the trailer (see 5.13);
- m) Fixing the tail end of the carrier tape (see 5.14).

5.2 Required dimensions for the cover tape sealed positions

Required dimensions for the cover tape sealed positions for Auto Loading Feeder are shown in Table 2.