

INTERNATIONAL STANDARD

**Packaging of components for automatic handling –
Part 3-1: Packaging of surface mount components on continuous tapes –
Type V – Pressed carrier tapes**

With IEC Norm 60286-3-1:2009



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2009 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

**Packaging of components for automatic handling –
Part 3-1: Packaging of surface mount components on continuous tapes –
Type V – Pressed carrier tapes**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

M

ICS 31.020; 31.240

ISBN 978-2-88910-091-0

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 General	5
1.1 Scope.....	5
1.2 Normative references	5
2 Terms and definitions	5
3 Tape dimensions	6
4 Polarity and orientation of components in the tape	8
5 Fixing of components and additional tape requirements.....	8
5.1 Specific requirements for Type V tapes	8
5.1.1 Minimum bending radius.....	8
5.1.2 Measurement method for carrier tape thickness (T and T_3).....	8
5.1.3 Measurement method for cavity (A_0 and B_0)	9
5.1.4 Measurement method for Cavity depth (dimension K_0).....	9
6 Packing	10
7 Marking	10
Annex A (informative) Specific requirements for Type V.....	11
Figure 1 – Sectional view of component cavity.....	6
Figure 2 – Dimensions	6
Figure 3 – Maximum allowed pocket offset.....	6
Figure 4 – Maximum component tilt, rotation and lateral movement	7
Figure 5 – Carrier tape thickness sectional	9
Figure 6 – Cavity cross-section	9
Figure 7 – Cavity depth dimension.....	10
Figure A.1 – Movement of components within the cavity	11
Table 1 – Constant dimensions of 8 mm pressed carrier tape	7
Table 2 – Variable dimensions of 8 mm pressed carrier tape	8
Table A.1 – Recommended dimension tolerances of cavity.....	12
Table A.2 – Peel force	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**Part 3-1: Packaging of surface mount components on continuous tapes –
Type V – Pressed carrier tapes**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60286-3-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

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

FDIS	Report on voting
40/1972/FDIS	40/1981/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.

IEC 60286-3-1 is to be used in conjunction with IEC 60286-3.

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

The 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 this publication will remain unchanged until the maintenance result 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.

A bilingual version of this publication may be issued at a later date.

Withdrawn
IECNORM.COM: Click to view the full PDF of IEC 60286-3-1:2009

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 3-1: Packaging of surface mount components on continuous tapes – Type V – Pressed carrier tapes

INTRODUCTION

Tape packaging meets the requirements of automatic component placement machines and also covers the use of tape packing for components for test purposes and other operations.

This International Standard describes a carrier tape comprising concave cavities formed by compression of bulk carrier material. This specification is for size 1608 and smaller.

1 General

1.1 Scope

This part of IEC 60286 is applicable to the taping of surface mount components using carrier tapes which have concave cavities formed by compression of the base material.

1.2 Normative references

The following referenced documents are indispensable for the application 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 60286-3:2007, *Packing of components for automatic handling – Part 3: Packing of surface mount components on continuous tapes*

2 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60286-3, as well as the following, apply.

2.1

pressed carrier tape

carrier tape with concave cavities formed by compression of the base material

2.2

fluff

fibre from the base material attached inside the cavity

2.3

burr

surface projection of tape unintentionally produced when cavity is formed

2.4

deformation

bulge on the inner wall of the cavity

2.5

puff

bulge on the reverse side of the cavity

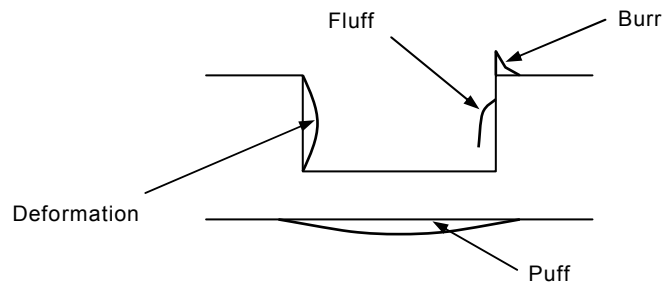


Figure 1 – Sectional view of component cavity

3 Tape dimensions

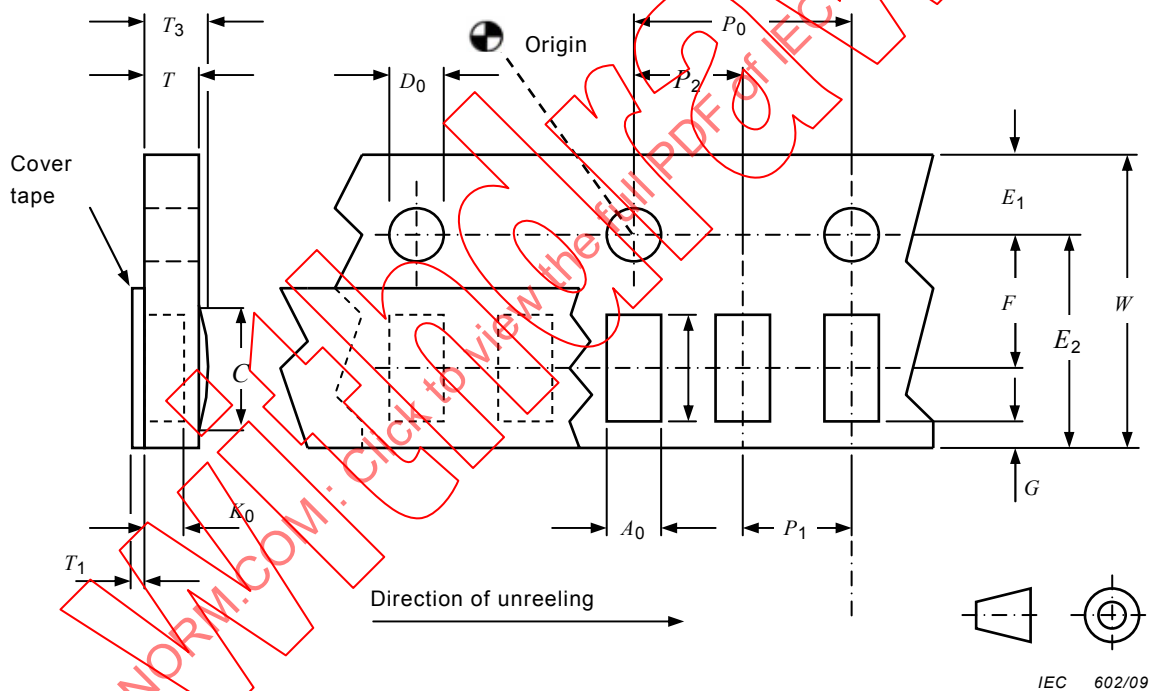


Figure 2 – Dimensions

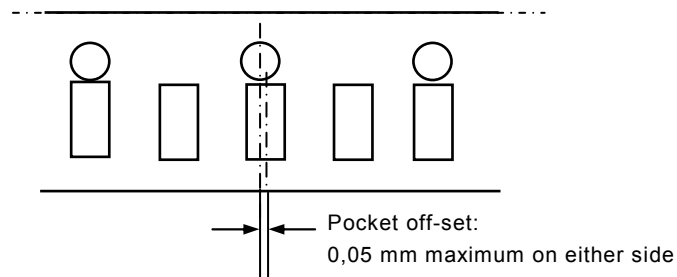


Figure 3 – Maximum allowed pocket offset

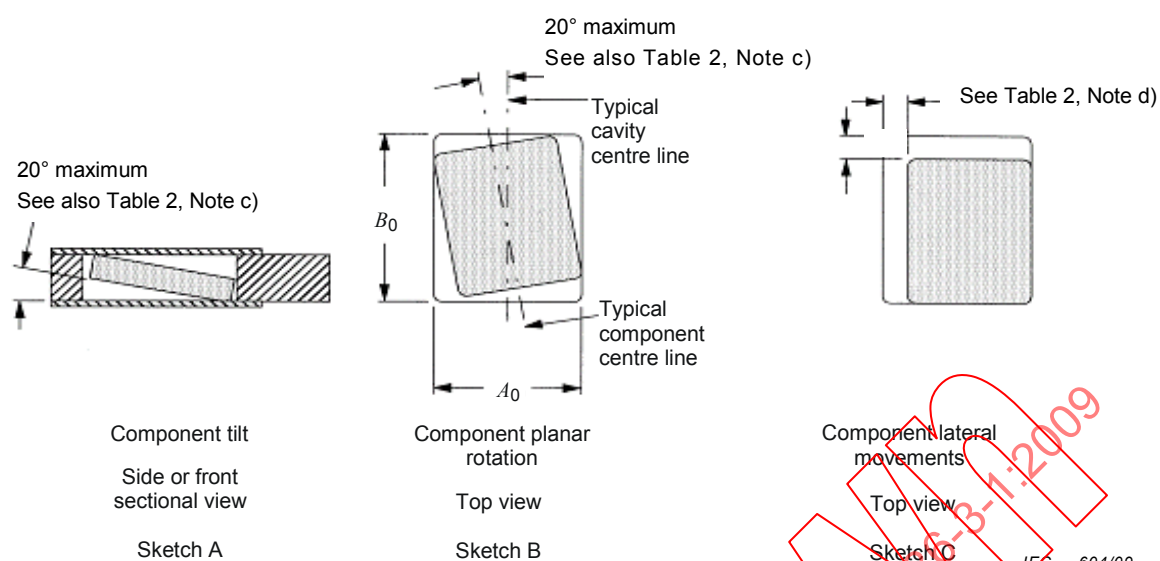


Figure 4 – Maximum component tilt, rotation and lateral movement

Table 1 – Constant dimensions of 8 mm pressed carrier tape

Tape size mm	D_0 mm	E_1 mm	$G_{\min}$ mm	P_0 mm	$T_{\max}$ mm	$T_{1\max}$ mm	$T_3-T_{\max}$ mm	Cumulative pitch (over 10 pitches) mm
8	$1,5^{+0,1}_0$	$1,75 \pm 0,1$	0,75	$4,0 \pm 0,1$	1,1	0,1	0,1	$\pm 0,1$

Table 2 – Variable dimensions of 8 mm pressed carrier tape

Tape size mm	$C_{\max}$ mm	E_2 min mm	F mm	P_1 mm	P_2 mm	W mm	A_0, B_0, K_0 mm
8	4,35	6,25	$3,5 \pm 0,05$	$2,0 \pm 0,05$	$2,0 \pm 0,05$	$8,0^{+0,3}_{-0,1}$	see NOTE

NOTE The nominal dimensions of the component compartment should be derived from the relevant component specification. The tolerances on the nominal sizes of the compartment should be selected so that the components cannot change their orientation within the tape and can be easily removed from the tape, with the following characteristics.

There should be sufficient clearance surrounding the component so that

- a) the component does not protrude above the top surface of the carrier tape,
- b) the component can be removed from the cavity in a vertical direction without mechanical restriction after the top cover tape has been removed,
- c) the rotation of the component is limited to a 20° maximum tilt (see Figure 2, sketch A) and a 20° maximum planar rotation (see Figure 3, sketch B),
- d) the maximum lateral movement allowed is 0,3 mm except for 1005M sized components where the maximum should be 0,20 mm and for 0603M sized components the maximum should be 0,12 mm (see Annex A).

For defined component positioning, the pocket positions should be defined to an origin point. This origin is the centre of the index hole, defined by the crosshair of the dimensions E_1 and P_0 . The centre of the component compartment is defined by P_2 and F , relative to the sprocket hole, as shown in Figure 2 with tolerances given in the table above.

Preferred dimensions for components should be taken from the relevant IEC specifications.

Dimensions $A_0 \leq B_0$, unless otherwise specified in the component detail specification.

For components with size designation of 1005M or smaller, the puff ($T_3 - T$) should be limited to 0,05 mm maximum.

If positioning precision is required, for example when components $\leq$ size 1005M are mounted in narrow space, then the tolerance on D_0 should be (+0,05 / 0,00) mm.

4 Polarity and orientation of components in the tape

Requirements shall be in accordance with IEC 60286-3, 4.1, 4.2.1 and 4.2.3.

5 Fixing of components and additional tape requirements

Requirements shall be in accordance with IEC 60286-3, 5.1, 5.2, 5.4, 5.5, 5.6, 5.7 and 5.8 and the following.

5.1 Specific requirements for Type V tapes

5.1.1 Minimum bending radius

The minimum bending radius ($R_{\min}$) shall be 25 mm.

5.1.2 Measurement method for carrier tape thickness (T and T_3)

The equipment used to conduct these measurements shall be an external micrometer with a measuring pressure of 1,5 N or smaller. The probe shall be made of super-hard material and the diameter of the probe head shall be 2,0 mm.

The thickness of the carrier tape shall be measured with an accuracy of 0,001 mm. The dimension of the thickness excluding the puff of the bottom of the cavity is T , when the flat side is measured adjacent to the sprocket holes. The dimension of the thickness including the puff on the bottom of the cavity is T_3 .

Measurement shall be made at the points shown in Figure 5.

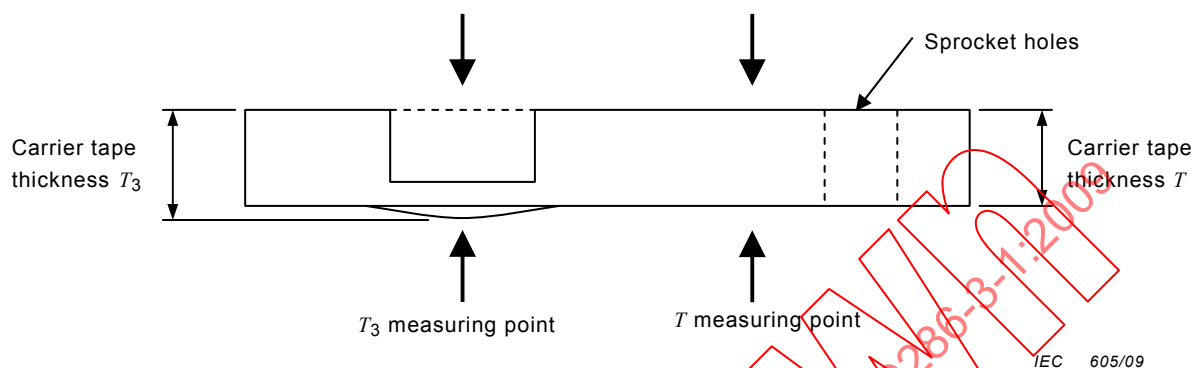


Figure 5 – Carrier tape thickness sectional

5.1.3 Measurement method for cavity (A_0 and B_0)

A measuring viewing scope with 10x magnification or more shall be used.

For dimensions A_0 and B_0 the minimum value including deformation of material shall be measured using an adequate light source to illuminate the surface of the tape and allow measurement of the features as shown in Figure 6. Fluff should be excluded from the dimension.

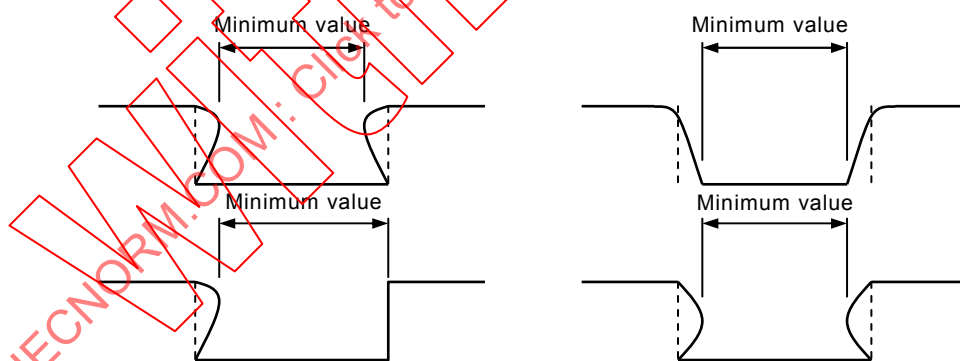


Figure 6 – Cavity cross-section

5.1.4 Measurement method for Cavity depth (dimension K_0)

A non-contact measuring system should be used.

The cavity depth K_0 is defined as the distance between the centre of the bottom of the cavity and the carrier surface at the centre point between the sprocket hole and the cavity.

A measurement can be performed according to Figure 7.

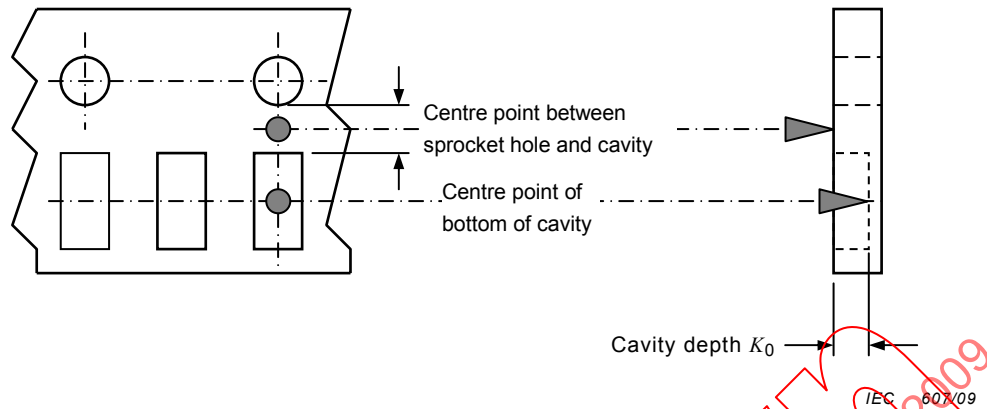


Figure 7 – Cavity depth dimension

6 Packing

Requirements shall be in accordance with IEC 60286-3, 7.1, 7.2 and 7.3.

7 Marking

Requirements shall be in accordance with IEC 60286-3, Clause 8.