

TECHNICAL REPORT

RAPPORT TECHNIQUE



**Packaging of components for automatic handling –
Part 7: Introduction of a bulk blister pack for miniaturized components**
(standards.iteh.ai)

**Emballage de composants pour opérations automatisées –
Partie 7: Introduction d'une plaquette thermoformée en volume pour des
composants miniaturisés**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

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 It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22.000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67.000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22.000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67.000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

TECHNICAL REPORT

RAPPORT TECHNIQUE



**Packaging of components for automatic handling –
Part 7: Introduction of a bulk blister pack for miniaturized components**

**Emballage de composants pour opérations automatisées –
Partie 7: Introduction d'une plaquette thermoformée en volume pour des
composants miniaturisés**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.020; 31.240

ISBN 978-2-8322-7413-2

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Existing bulk feeding systems and challenges	6
4.1 Challenges of miniaturized components	6
4.2 Limitations of existing bulk feeding systems.....	7
5 Bulk blister pack	7
5.1 General conception.....	7
5.1.1 Packaging style	7
5.1.2 Component pockets	7
5.1.3 Sealing	7
5.1.4 Identification and labelling	7
5.2 Outline and dimensions.....	8
5.2.1 Outline.....	8
5.2.2 Dimensions.....	9
5.3 Properties	10
5.3.1 Material	10
5.3.2 Electrostatic properties	10
6 Bulk feeding system	10
6.1 Applicability for component types and sizes	10
6.2 Example of an innovative bulk feeding system	10
Bibliography.....	12
Figure 1 – Typical bulk blister pack (structure).....	8
Figure 2 – Typical bulk blister pack (mechanism).....	8
Figure 3 – Typical bulk blister pack (overall dimensions).....	9
Figure 4 – Typical bulk blister pack (blister strip dimensions).....	10
Figure 5 – Pick up area with components.....	11

iTeh STANDARD PREVIEW
 (standards.iteh.ai)
 IEC TR 60286-7:2019
<https://standards.iteh.ai/catalog/standards/sist/e8a65c85-01b3-4082-afe9-37d65556/aaa/iec-tr-60286-7-2019>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**Part 7: Introduction of a bulk blister pack for miniaturized components****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.
<http://standards.iteh.ai/catalog/standards/si/18265-85-01b2-1082-ef19>
<https://www.itsc.com/standards/iec-tr-60286-7-2019>
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 60286-7, which is a technical report, has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
40/2648/DTR	40/2676/RVDTR

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

This document 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 document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC TR 60286-7:2019](#)

<https://standards.iteh.ai/catalog/standards/sist/e8a65c85-01b3-4082-afe9-37d655567aaa/iec-tr-60286-7-2019>

INTRODUCTION

Purpose of this Technical Report

This Technical Report includes the practical experience made during pilot projects and a proposal for standardization of the interface between the package and automatic assembly systems as well as requirements to the properties of the package itself.

Patent situation

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning a “magazine for portion-wise receiving individualized electronic components which are present in bulk”¹.

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

The holder of this patent right has assured the IEC that he/she is willing to negotiate licences free of charge with applicants throughout the world for claims related to the items described in this Technical Report. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

ASM Assembly Systems GmbH & Co.KG, Munich(DE)

Rupert-Mayer-Straße 44, 81379 München

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

ISO (www.iso.org/patents) and IEC (<http://patents.iec.ch>) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

¹ German Patent: DE102016125495, published 28.06.2018

United States Patent Application: US 2018/0184555 A1

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 7: Introduction of a bulk blister pack for miniaturized components

1 Scope

This part of IEC 60286 contains information about the introduction of an innovative bulk blister packing system for miniaturized components, for example chip type components of size 1005 (metric) and smaller. It includes a proposal for standardization of the interface between the packaging and automatic assembly systems and requirements to the properties of the packaging.

2 Normative references

There are no normative references in this document.

3 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>

3.1

packaging

product made of any material or any nature to be used for the containment, protection, and structured alignment for automatic assembly, handling and delivery

[SOURCE: IEC 60286-3:2019, 3.1.3]

3.2

packing

operations involved in the preparation of goods for containment, protection, and structured alignment for automatic assembly, handling, and delivery

3.3

blister pack

type of packaging in which components are packed, consisting of domes of plastic

EXAMPLE The example is shown in Figure 1.

4 Existing bulk feeding systems and challenges

4.1 Challenges of miniaturized components

Progressing miniaturization of components has caused an increasing mismatch between packaging volume and component size, where the volume of components became just a small percentage of the total packaging volume in the case of tape and reel packaging.

In addition, to enable a smooth pick and place process of such components, tight tolerances of pocket sizes are needed, which are technically difficult to achieve and increase costs.

As an alternative, bulk packaging and feeding systems had been developed in the past.

4.2 Limitations of existing bulk feeding systems

Existing bulk feeding systems are based on linear feeders, which show various constraints:

- tight dimensional tolerances of components required;
- variation of component thickness is critical;
- cubical components cannot be handled;
- difficult cleaning processes;
- risk of mixed components.

5 Bulk blister pack

5.1 General conception

5.1.1 Packaging style

Blister with seven pockets, five filled with components, one empty pocket and one smaller size pocket for orientation (Figure 1 and Figure 4).

The small pocket is for mechanical orientation and indicates the end of the strip. The first pocket is intentionally empty to avoid accidental loss of components during handling.

NOTE The smaller size pocket can be used for provision of test samples, for example for inspection.

5.1.2 Component pockets

The dimensions and maximum filling level of pockets are designed such, that the volume is aligned to the maximum capacity of bulk feeders.

The dimensions and maximum filling level of pockets shall be specified such, that packed components will not be damaged during transport and handling.

5.1.3 Sealing

The complete circumference of pocket shall be sealed strongly enough to prevent accidental loss of components during transportation and handling, but not exceed 15 N when pulled off in a 180° direction. The seal tape shall be not sticky, so that the packed components do not attach to the seal.

5.1.4 Identification and labelling

5.1.4.1 Information on label on top

The label on top contains the same information as in the matrix code on the bottom side, and provides the minimum content described below:

- manufacturer identification;
- manufacturer part number;
- quantity;

NOTE The quantity information on the label is the total quantity of components contained in the blister packaging. The filling quantity of the component pockets is the same in all five pockets.

- lot code.

Additional information can be given as appropriate, also in human readable form.

Details can be found in IEC 62090.

5.1.4.2 Information on label on bottom

A label is placed on the first filled pocket with information identical to that on the bar code on top (see 5.1.4.1), but in the form of a 2D-matrix code.

5.2 Outline and dimensions

5.2.1 Outline

The structure of a typical bulk blister pack is shown in Figure 1.



Figure 1 – Typical bulk blister pack (structure)

The mechanism of a typical bulk blister pack is shown in Figure 2.

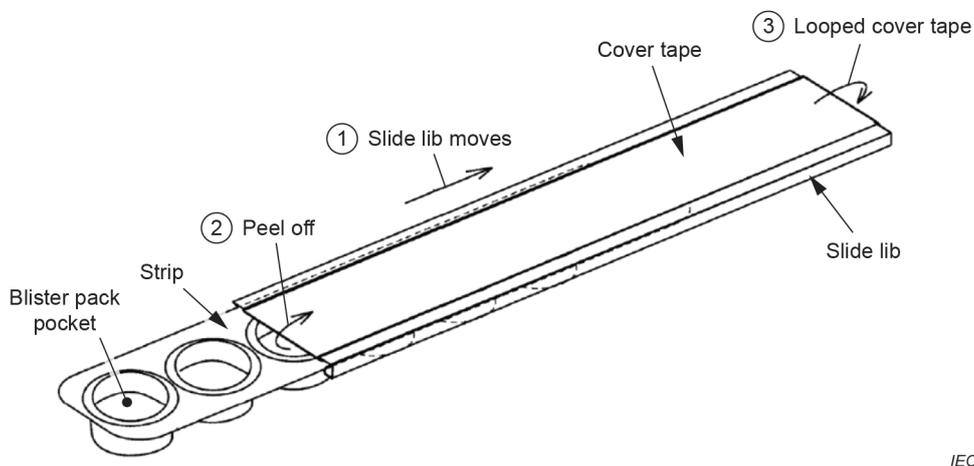
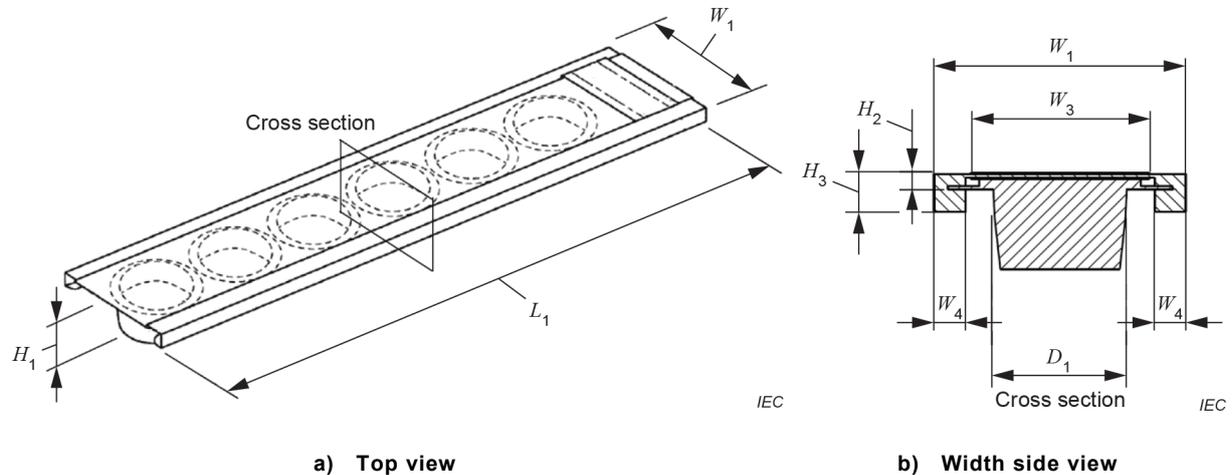


Figure 2 – Typical bulk blister pack (mechanism)

5.2.2 Dimensions

The dimensions of a typical bulk blister pack are shown in Figure 3 and Figure 4.

NOTE It is possible that the slide lid does not cover the blister strip completely.



Key

L_1	Length = 169 mm \pm 1 mm
H_1	Height = (13,7 \pm 1) mm
W_1	Width = 35,8 mm \pm 1 mm
W_3	Width of cover tape = 28,0 mm max. (considering seal runout)
W_4	Width of rim of the slide lid = 2,7 mm to 5,0 mm
D_1	Diameter of pocket = ϕ 19 mm \pm 0,2 mm
H_2	Height of pass line = 2 mm \pm 0,2 mm
H_3	Thickness of slide lid = 4,0 mm to 6,0 mm

Figure 3 – Typical bulk blister pack (overall dimensions)