
**Pakiranje komponent za avtomatsko obdelavo – 5. del: Ploščati vlagalniki ???
(IEC 60286-5:2003)**

Packaging of components for automatic handling - Part 5: Matrix trays (IEC 60286-5:2003)

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EUROPEAN STANDARD

EN 60286-5

NORME EUROPÉENNE

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May 2004

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Supersedes EN 60286-5:1997

English version

Packaging of components for automatic handling
Part 5: Matrix trays
(IEC 60286-5:2003)

Emballage de composants
pour opérations automatisées
Partie 5: Supports matriciels
(CEI 60286-5:2003)

Gurtung und Magazinierung
von Bauelementen für automatische
Verarbeitung
Teil 5: Flachmagazine
(IEC 60286-5:2003)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 40/1341/FDIS, future edition 2 of IEC 60286-5, prepared by IEC TC 40, Capacitors and resistors for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60286-5 on 2004-05-01.

This European Standard supersedes EN 60286-5:1997.

Significant technical changes from EN 60286-5:1997 are:

- a) The generic rules for the design of matrix trays are given in this standard. Newly developed trays which follow these rules will not be listed individually. Only those trays which conform to the design rules set forth herein are classified as "standard trays" and are thus preferred for use.
- b) An update of the matrix trays, which do not conform to the design rules set forth herein, are considered as "non-standard trays" and are not preferred for use, is listed in Annex A.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-05-01

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Endorsement notice

The text of the International Standard IEC 60286-5:2003 was approved by CENELEC as a European Standard without any modification.

INTERNATIONAL STANDARD

IEC 60286-5

Second edition
2003-10

Packaging of components for automatic handling –

Part 5: Matrix trays

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*Emballage de composants pour
opérations automatisées –*

SIST EN 60286-5:2005

Partie 5: Supports matriciels

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –**Part 5: Matrix trays**

FOREWORD

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International Standard IEC 60286-5 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This second edition cancels and replaces the first edition published in 1995 and constitutes a technical revision.

This edition includes the following significant technical changes from the previous edition.

- a) The generic rules for the design of matrix trays are given in this standard. Newly developed trays which follow these rules will not be listed individually. Only those trays which conform to the design rules set forth herein are classified as "standard trays" and are thus preferred for use.
- b) An update of the matrix trays, which do not conform to the design rules set forth herein, are considered as "non-standard trays" and are not preferred for use, is listed in Annex A.

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

FDIS	Report on voting
40/1341/FDIS	40/1364/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.

The committee has decided that the contents of this publication will remain unchanged until 2005. 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.

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PACKAGING OF COMPONENTS FOR AUTOMATIC HANDLING –

Part 5: Matrix trays

1 Scope

This part of IEC 60286 describes the common dimensions, tolerances and characteristics of the tray. It includes only those dimensions which are essential for the handling of the trays for the stated purpose and for placing or removing components from the trays.

Matrix trays are designed to facilitate the transport and handling of electronic components during their testing, baking, transport/storage, and final mounting by automatic placement equipment.

The generic rules for their design are given in this standard.. Newly developed trays which follow these rules will not be listed individually . Only those trays which conform to the design rules set forth herein are classified as “standard trays” and are thus preferred for use.

NOTE Matrix trays listed in Annex A which do not conform to the design rules set forth herein shall be considered as “non-standard trays” and are not preferred for use.

2 Material

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2.1 Electrostatic dissipative requirements

Trays shall be moulded from material that meets the ESD dissipative requirements which are: equal to, or greater than, $1,0 \times 10^5$ ohms/square but less than $1,0 \times 10^{12}$ ohms/square.

2.2 Effect of properties

The tray material shall not adversely affect the mechanical, electrical characteristics, solderability, or marking of the component during or after transport, baking or storage in the tray.

2.3 Recycling and rigidity

The tray material shall be reusable or recyclable and shall be rigid enough to avoid damage to the components during handling, loading, baking, testing, shipping and placement operations.

There should be space for a recycle logo and material code or material declaration close to ‘Detail B’.

3 Mechanical stability

3.1 Loaded tray

Mechanical stability of loaded trays shall be such that the components are adequately retained, without lead damage, and can be easily removed from the tray.

3.2 Empty tray

The empty tray shall withstand normal environmental conditions (including component baking temperatures, if required) without distorting, warping, expanding, shrinking or any other physical change outside the specified dimensions of the trays.

3.3 Outer edges

The outer edges of the tray shall be of sufficient thickness and strength to allow mechanical positioning and clamping.

4 Tray design, dimensions and other physical properties

4.1 Tray design

4.1.1 Number of pockets

All new tray proposals should maximize the number of pockets in each tray-family variation without violating the pocket-density design rules specified in 4.1.3.

4.1.2 Orientation of pockets

When designing a tray for a rectangular package, the longest dimension (D) of the package is oriented parallel to the length of the tray to maximize tray pocket density.

4.1.3 Design rules for pocket density

4.1.3.1 Formulas

DT is D_{\max} + strengthening pocket rib width W

ET is E_{\max} + strengthening pocket rib width W

M is $(135,9 \text{ mm} - M3(N1 - 1))/2$

$M1$ is $(315,0 \text{ mm} - M2(N2 - 1))/2$

$M2$ is $[(315,0 \text{ mm} - 6,4 \text{ mm}) - W(N2 - 1)]/N2 + W$

$M3$ is $[(135,9 \text{ mm} - 6,4 \text{ mm}) - W(N1 - 1)]/N1 + W$

$N1$ is $(135,9 \text{ mm} - 6,4 \text{ mm})/ET$ (rounded down to a whole number)

$N2$ is $(315,0 \text{ mm} - 6,4 \text{ mm})/DT$ (rounded down to a whole number)

NOTE After the maximum matrix has been established by the above calculation using a minimum W value, $N1$ and $N2$ may not have resulted in even numbers and may therefore have been rounded down to the nearest whole number. This means we may have fractions of millimetres extra that should be added back to $M2$ and $M3$ to maximize the pitch between the pockets while minimizing the edge of the tray to the centre line of the first pocket M and $M1$.

4.1.3.2 Constituents of the design rules, formulas and drawings

D_{\max} is determined by appropriate specification

DT is the max. length D + strengthening pocket rib width W

E_{\max} is determined by appropriate specification

ET is the max. width E + strengthening pocket rib width W

M is the edge of the tray width to the centre line of the first pocket

$M1$ is the edge of the tray length to the centre line of the first pocket

$M2$ is the pitch of the tray pocket in the tray length

$M3$ is the pitch of the tray pocket in the tray width

N is the package lead counts supported

$N1$ is the number of columns in the tray

$N2$ is the number of rows in the tray

$N3$ is the total number of pockets in the tray ($N1 \times N2 = N3$)

- $N4$ is the package type accommodated
- $N5$ is the end vacuum pick-up area(s)
- $N6$ is the centre vacuum pick-up area(s)
- W is the strengthening pocket rib width

NOTE The tray sponsor will determine W from the latest manufacturing capabilities and design feature needs at the time of the new tray-family design.

W should not exceed the target value of 2,00 mm in order to achieve the maximum tray density unless required by application.

4.2 Overall tray dimensions

Overall tray dimensions shall be 322,6 mm in length and 135,9 mm in width. Overall height A , stacking step height $A1$ and edge height $A2$ are given in Table 1.

Table 1 – Height dimensions

Dimension	Thin tray mm	Thick tray mm
A	7,62	12,19
$A1$	6,35	10,16
$A2$	1,27 typically	2,00 typically

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4.3 Cell dimensions

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Cell dimensions are derived from package dimensions. The information given in this section is intended for reference only. Package types shown in Figures 1 and 2 are not intended in any way to limit types of present or future designs which may require matrix trays.

D and E dimensions represent the largest overall features of a package (lead or body).