SLOVENSKI STANDARD
SIST EN 1758:2000

01-november-2000

Baker in bakrove zlitine - Trak za nosilce s priključ ki za polprevodniške komponente

Copper and copper alloys - Strip for lead frames

Kupfer und Kupferlegierungen - Bänder für Systemträger

Cuivre et alliages de cuivre - Bandes pour grilles de composants (lead frames)

Ta slovenski standard je istoveten z: **EN 1758:1997**

ICS:

77.150.30 Bakreni izdelki Copper products

SIST EN 1758:2000 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1758

December 1997

ICS 77.150.30

Descriptors: copper, copper alloys, rolled products, steel strips, integrated circuits, electronic components, designation, materials, dimensions, dimensional tolerances, mechanical properties, surface properties, chemical composition, roughness, marking

English version

Copper and copper alloys - Strip for lead frames

Cuivre et alliages de cuivre - Bandes pour grilles de composants (lead frames)

Kupfer und Kupferlegierungen - Bänder für Systemträger

This European Standard was approved by CEN on 6 November 1997.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN 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 CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

		Page
Foreword		3
1	Scope	4
2	Normative references	4
3	Definitions	5
3.1	strip	5
3.2	lead frame	5
4	Designations	5
4.1	Material	5
4.2	Material condition	5
4.3	Product	5
5	Ordering information	6
6	Requirements	8
6.1	Composition	8
6.2	Mechanical properties	8
6.3	Technological properties	8
6.4	Dimensions and tolerances	8
6.5	Form tolerances	8
6.6	Surface properties	10
6.7	Edge stress	11
6.8	Electrical conductivity	11
7	Sampling	11
7.1	General	11
7.2	Analysis	11
7.3	Mechanical and other tests	11
8	Test methods	12
8.1	Analysis	12
8.2	Tensile test	12
8.3	Hardness test	12
8.4	Bend test	12
8.5	Edge burr *b*	12
8.6	Coil set	12
8.7	Transverse cross bow *q*	12
8.8	Twist α	13
8.9	Roughness	13
8.10	Solderability	13
8.11	Edge stress	13
8.12	Electrical resistivity or conductivity test	14
8.13	Retests	15
8.14	Rounding of results	15
9	Declaration of conformity and inspection documentation	15
9.1	Declaration of conformity	15
9.2	Inspection documentation	15
10	Marking, packaging, labelling	15
Table 1:	Composition of copper	16
Table 2:	Composition of low alloyed copper alloys	16
Table 3:	Mechanical properties	17
Table 4:	Tolerances on thickness	18
Table 5:	Tolerances on width	18
Table 6:	Edgewise curvature *c*	18
Table 7:	Edge burr *b*	19
Table 8:	Coil set	19
Table 9:	Transverse cross bow *q*	19
Table 10:	Roughness	20
Annex A (informative)	Physical properties	21
Annex B (informative)	Bibliography	21
Annex C (normative)	Lead fatigue test	22

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 133 "Copper and copper alloys", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 1998, and conflicting national standards shall be withdrawn at the latest by June 1998.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 2 "Rolled flat products" to prepare the following standard:

EN 1758
Copper and copper alloys – Strip for lead frames

This is one of a series of European Standards for copper and copper alloy rolled flat products. Other products are, or will be, specified as follows:

EN 1172
Copper and copper alloys – Sheet and strip for building purposes

EN 1652
Copper and copper alloys – Plate, sheet, strip and circles for general purposes

EN 1653
Copper and copper alloys – Plate, sheet and circles for boilers, pressure vessels and hot water storage units

EN 1654
Copper and copper alloys – Strip for springs and connectors

Copper and copper alloys – Copper plate, sheet and strip for electrical purposes (WI: 00133022)

This standard gives information, which might be useful to the user, on physical properties of the product contained in annex A.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the composition, property requirements and tolerances on dimensions and form for copper and copper alloy strip for lead frame material, with widths up to and including 100 mm. Thicknesses from 0,1 mm up to and including 1,0 mm are generally used for stamped lead frames for integrated circuits and low power devices and thicknesses from 1,0 mm up to and including 2,0 mm are generally used for stamped lead frames for high power devices.

The sampling procedures, the methods of test for verification of conformity to the requirements of this standard, and the delivery conditions are also specified.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 1655
Copper and copper alloys – Declarations of conformity

EN 10002-1
Metallic materials – Tensile testing – Part 1: Method of test (at ambient temperature)

EN 10204
Metallic products – Types of inspection documents

ISO 1811-2
Copper and copper alloys – Selection and preparation of samples for chemical analysis – Part 2: Sampling of wrought products and castings

ISO 4287-1
Surface roughness – Terminology – Part 1: Surface and its parameters

ISO 6507-2
Metallic materials – Hardness test – Vickers test – Part 2: HV 0,2 to less than HV 5

ISO 6507-3
Metallic materials – Hardness test – Vickers test – Part 3: Less than HV 0,2

ISO 7438
Metallic materials – Bend test

ISO 7799
Metallic materials – Sheet and strip 3 mm thick or less – Reverse bend test

HD 323.2.20 S3
Environmental testing – Part 2: Tests – Test T: Soldering

NOTE: Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in a bibliography, see annex B.

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 strip

Flat rolled product of rectangular cross-section with uniform thickness from at least 0,10 mm, supplied as level wound coils usually with slit edges. The thickness does not exceed one tenth of the width.

3.2 lead frame

Part which has been stamped or etched from a strip for assembling, carrying and effecting the electrical connections of semi-conductor components.

4 Designations

4.1 Material

4.1.1 General

The material is designated either by symbol or number (see tables 1 and 2).

4.1.2 Symbol

The material symbol designation is based on the designation system given in ISO 1190-1.

NOTE: Although material symbol designations used in this standard might be the same as those in other standards using the designation system given in ISO 1190-1, the detailed composition requirements are not necessarily the same.

4.1.3 Number

The material number designation is in accordance with the system given in EN 1412.

4.2 Material condition

For the purposes of this standard, the following designations, which are in accordance with the system given in EN 1173, apply for the material condition:

R... Material condition designated by the minimum value of tensile strength requirement for the product with mandatory tensile strength and elongation requirements;

H... Material condition designated by the minimum value of hardness requirement for the product with mandatory hardness requirements.

Exact conversion between material conditions designated R... and H... is not possible.

Material condition is designated by only one of the above designations.

4.3 Product

The product designation provides a standardized pattern of designation from which a rapid and unequivocal description of a product is conveyed in communication. It provides mutual comprehension at the international level with regard to products which meet the requirements of the relevant European Standard.

The product designation is no substitute for the full content of the standard.

The product designation for products to this standard shall consist of:

- denomination (Strip);
- number of this European Standard (EN 1758);
- material designation, either symbol or number (see tables 1 and 2);
- material condition designation (see table 3);
- nominal dimensions (thickness × width).

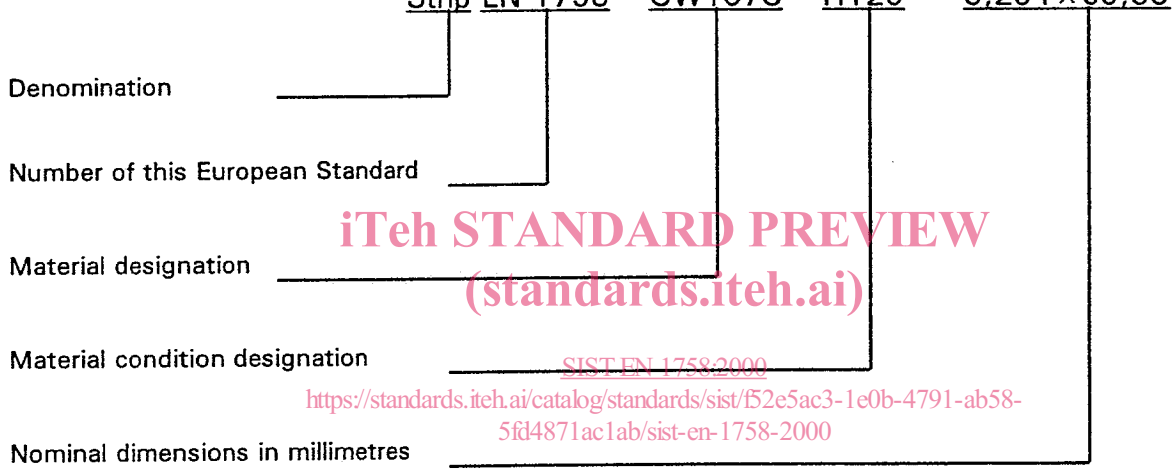
The derivation of a product designation is shown in the following example.

EXAMPLE:
Strip conforming to this standard, in material designated either CuFe2P or CW107C, in material condition H120, nominal thickness 0,254 mm, nominal width 59,63 mm, shall be designated as follows:

Strip EN 1758 – CuFe2P – H120 – 0,254 × 59,63

or

Strip EN 1758 – CW107C – H120 – 0,254 × 59,63



5 Ordering information

In order to facilitate the enquiry, order and confirmation of order procedures between the purchaser and the supplier, the purchaser shall state on his enquiry and order the following information:

a) quantity of product required (mass);

b) denomination (Strip);

c) number of this European Standard (EN 1758);

d) material designation (see tables 1 and 2);

e) material condition designation (see 4.2 and table 3);

f) nominal dimensions (thickness × width);

g) coil size requirements: nominal inside diameter in millimetres and maximum outside diameter in millimetres and either maximum mass in kilograms or approximate specific coil weight (mass per width) in kilograms per millimetre.

NOTE 1: It is recommended that the product designation as described in 4.3, is used for items b) to f).

In addition, the purchaser shall also state on the enquiry and order any of the following, if required:

h) whether a 90° bend test according to ISO 7438 is required (see 6.3). If so, the acceptance criteria required;

i) whether a reverse bend test according to ISO 7799 is required (see 6.3). If so, the dimensions, alignment of the test piece to the rolling direction of the strip, the tensile load and the acceptance criteria required;

j) whether a lead fatigue test according to annex C is required (see 6.3). If so, the acceptance criteria required;

k) whether edgewise curvature shall be measured over a length of 2 000 mm (see 6.5.1);

l) whether there is a requirement for limitation of coil set for strip thicknesses over 0,5 mm (see 6.5.3.1);

m) whether there is a requirement for limitation of twist (see 6.5.3.3);

n) which measuring device is to be used for the determination of transverse cross bow (see 8.7);

o) whether the solderability test according to HD 323.2.20 S3 is required (see 6.6.3);

p) whether there is a requirement for limitation of edge stress (see 6.7). If so, the acceptance criteria required;

NOTE 2: The details of the test method and the acceptance criteria should be agreed between the purchaser and the supplier.

q) whether there is a requirement for minimum electrical conductivity (see 6.8). If so, the acceptance criteria required and the test method if it is not to be left to the discretion of the supplier;

r) whether a declaration of conformity is required (see 9.1.);

s) whether an inspection document is required, and if so which type (see 9.2);

t) whether there are any special requirements for marking, packaging or labelling (see clause 10).

EXAMPLE:
Ordering details for 1 500 kg strip conforming to EN 1758, in material designated either CuFe2P or CW107C, in material condition H120, nominal thickness 0,254 mm, nominal width 59,63 mm, with nominal inside diameter of coil 400 mm, maximum outside diameter of coil 915 mm, approximate specific coil weight (mass per width) 4,0 kg/mm:

1 500 kg Strip EN 1758 – CuFe2P – H120 – 0,254 × 59,63
– nominal inside diameter of coil 400 mm
– maximum outside diameter of coil 915 mm
– approximate specific coil weight 4,0 kg/mm

or

1 500 kg Strip EN 1758 – CW107C – H120 – 0,254 × 59,63
– nominal inside diameter of coil 400 mm
– maximum outside diameter of coil 915 mm
– approximate specific coil weight 4,0 kg/mm

6 Requirements

6.1 Composition

The composition shall conform to the requirements for the appropriate material given in tables 1 and 2.

NOTE: These materials have been taken into account as being the most common materials in Europe and meeting the guidelines of CEN/TC 133 for the standardization of materials.

6.2 Mechanical properties

The mechanical properties shall conform to the appropriate requirements given in table 3. The tests shall be carried out in accordance with either 8.2 (tensile) or 8.3 (hardness).

6.3 Technological properties

Strip shall be tested in accordance with the method(s) selected from those given in 8.4 when requested by the purchaser [see 5 h), 5 i) and 5 j)] and shall meet the acceptance criteria agreed between the purchaser and the supplier.

6.4 Dimensions and tolerances

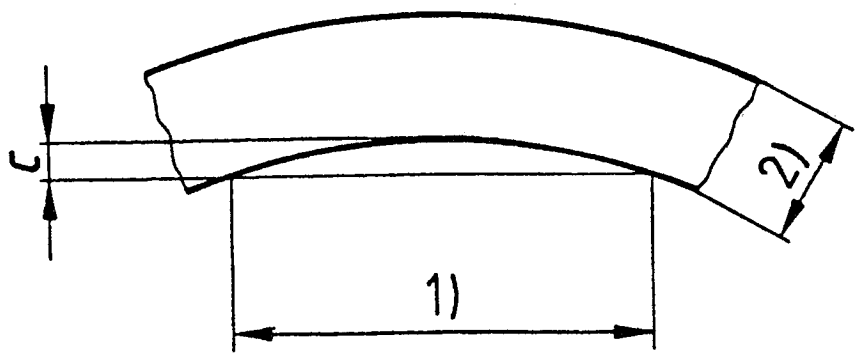
Strip shall conform to the tolerances given in tables 4 and 5.

6.5 Form tolerances

6.5.1 Edgewise curvature *c*

For the straightness of the longitudinal edge, which unless otherwise agreed between the purchaser and the supplier shall be based on a measuring length of 1 000 mm, the edgewise curvature *c* (see figure 1) shall not exceed the values given in table 6.

If the purchaser and the supplier agree on a measuring length of 2 000 mm, the edgewise curvature *c* shall not exceed the values given in table 6 multiplied by 4.



1) measuring length
2) strip width

Figure 1: Edgewise curvature *c*

6.5.2 Edge burr *b*

The height of edge burrs (see figure 2) shall not exceed the values given in table 7.

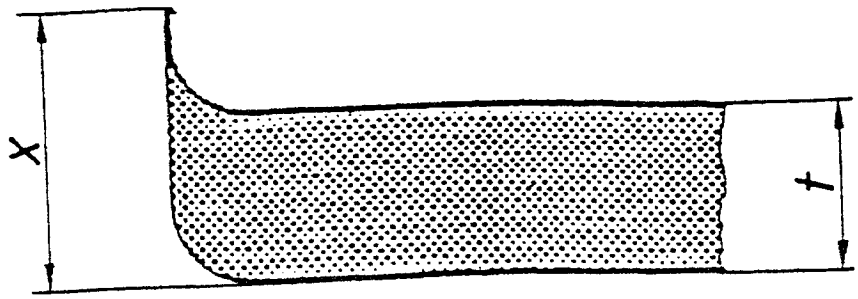


Figure 2: Edge burr *b*

height of edge burr $b = x - t$

where:

x is the height of edge burr measured from the opposite side of the strip;

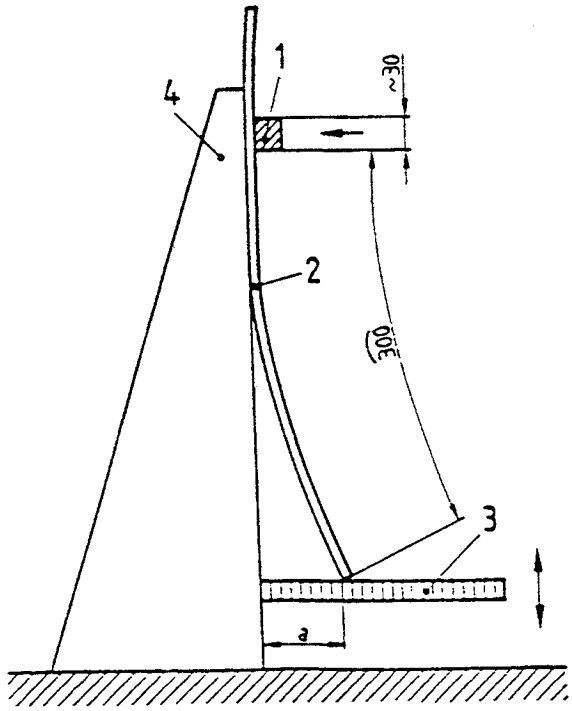
t is the thickness.

6.5.3 Flatness

6.5.3.1 Coil set

The coil set is measured as the deflection *a* from the vertical of a 300 mm long portion of a strip (see figure 3), for thicknesses up to and including 0,5 mm and with widths equal to or greater than 15 mm, coiled with an inside diameter equal to or greater than 400 mm. The test shall be carried out in accordance with 8.6. The deflection shall not exceed the values given in table 8.

If a limitation of coil set is required for strip over 0,5 mm thickness, the acceptance criteria shall be agreed between the purchaser and the supplier.



1 holder
2 strip
3 scale
4 stand

Dimensions in millimetres

Figure 3: Coil set as measured by deflection *a*