AMENDMENT NO. 1 DECEMBER 2024
TO
IS/IEC 60127 (PART 4) : 2005 MINIATURE FUSES
PART 4 UNIVERSAL MODULAR FUSE-LINKS (UMF) — THROUGH-HOLE AND SURFACE MOUNT TYPES

This amendment to Indian Standards IS/IEC 60127 (Part 4) : 2005 is identical to Amendment No. 1 (2008) and Amendment No. 2 (2012) to IEC 60127-4 : 2005 issued by International Electrotechnical Commission (IEC).

Price Group 4

Introduction

Delete the last two paragraphs.

1 Scope and object

Delete the fourth paragraph.

2 Normative references

Replace the reference to IEC 60068-2-20:1979 and its amendments with the following new reference.

IEC 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

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7.3 Fuse-bases for tests

7.3.1 General requirements

Replace, in the second paragraph, the second dashed item commencing "… the nominal thickness of copper layer … " *by the following:*

- the nominal thickness of copper layer shall be 0,035 mm (0.070 mm for rated currents above 5 A).

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8.6 Solderability of terminations

Replace 8.6 and the changes made to it by Amendment 1 by the following new text:

8.6.1 Through-hole fuse-links

The fuse-links shall be subjected to Test Ta of IEC 60068-2-20:2008, using Method 1, with the following conditions:

Ageing:	None (as received)
Immersion conditions:	250 °C ± 3 °C, 3 s ± 0,3 s
Depth of immersion:	2,0 mm ± 0,5 mm (from seating plane)
Flux type:	Non-activated
Screen:	A screen should be used

After the test, the dipped surface shall be covered with a smooth and bright solder coating, with no more than small amounts of scattered imperfections such as pin-holes or un-wetted or de-wetted areas. These imperfections shall not be concentrated in one area. 10 × magnification shall be used.

A different solder bath temperature may be chosen because of the usage of various solders. The relevant combination of the solder bath temperature and the solder alloy shall be chosen according to IEC 60068-2-20:2008, Table 1.

8.6.2 Surface mount fuse-links

The fuse-links shall be tested according to 6.2 of IEC 60068-2-58:2004, with the following conditions:

Ageing:	None (as received)
Immersion conditions:	245 °C ± 5 °C, 3 s ± 0,3 s
Depth of immersion:	The terminations shall be immersed successively in such a way that the entire metal surfaces are covered by the solder bath
Flux type:	Non-activated

After the test, the contact areas shall be covered with a smooth and bright solder coating with no more than small amounts of scattered imperfections such as pin-holes or un-wetted or de-wetted areas. These imperfections shall not be concentrated in one area. 10 × magnification shall be used.

A different solder bath temperature may be chosen because of the usage of various solders. The relevant combination of the solder bath temperature and the solder alloy shall be chosen according to IEC 60068-2-58:2004 Table 2.

8.7.1 Through-hole fuse-links

Replace the first sentence by the following new sentence:

The fuse-links shall be subjected to Test Tb of IEC 60068-2-20:2008, Method 1, with the following conditions:

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8.7.2 Surface mount fuse-links

Replace the first sentence as follows:

The fuse-links shall be tested according to 6.2 of IEC 60068-2-58, with the following conditions:

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9.7 Fuse-link temperature

In item a) replace the second sentence “The temperature rise shall not exceed 70 K for rated current up to and including 6,3 A, and 85 K for rated current above 6,3 A;” *by the following:*

The temperature rise shall not exceed 75 K for fuse-links with rated current up to and including 6,3 A and 95 K for rated current above 6,3 A;

In item b) replace the last sentence "The temperature rise shall not exceed 85 K." *by the following:*

The temperature rise shall not exceed 95 K.

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Figure 2 – Test board for through-hole fuse-links

Replace, in the key to Figure 2, all three occurrences of "6,3 A" *by* "5 A".

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Figure 3 – Test board for surface mount fuse-links

Replace, in the key to Figure 3, the two references to "6,3 A" *by* "5 A".

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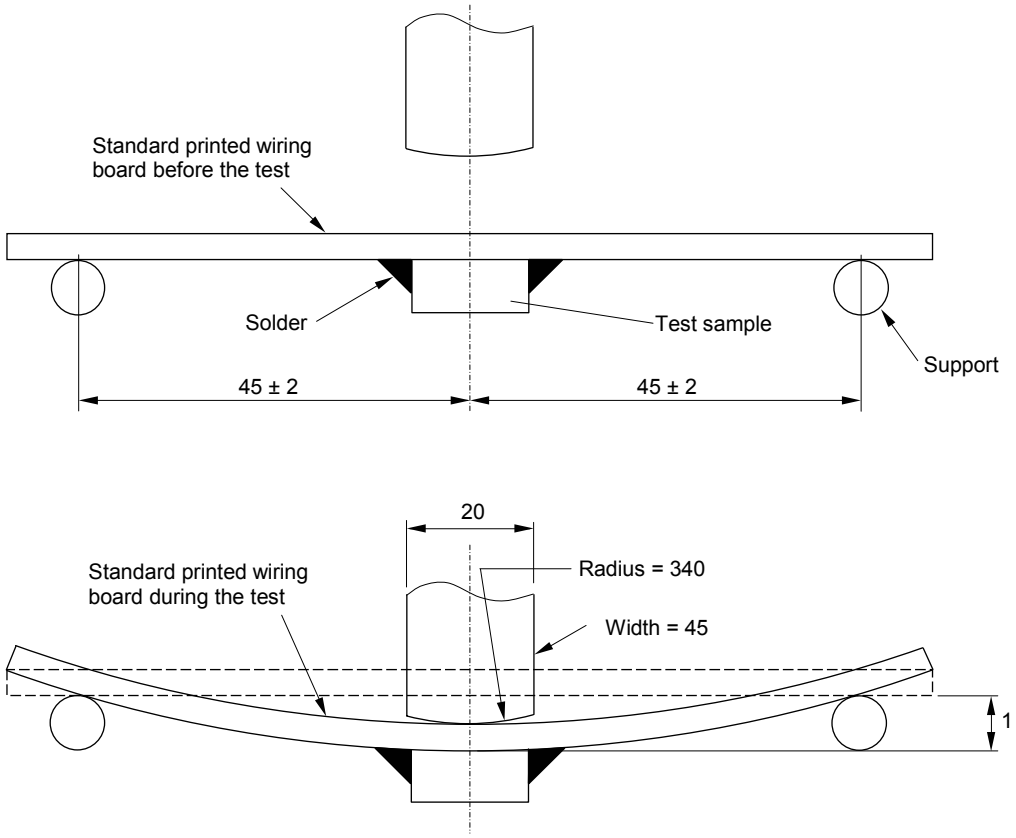
Figure 5– Bending jig for surface-mount fuse-links

Replace the drawings of Figure 5 by the following new drawings:

Dimensions in millimetres



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10.2 Standard sheet 2 – Surface mount fuse-links

Replace, in the table of values, under column "Minimum terminal spacing"*, for fuse-links with rated voltage 250 V (low-breaking capacity) the value* "4" *by the value* "2,5"*.*

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Annex A
(informative)

Mounting for surface mount fuse-links

Replace the text of Annex A by the following new text:

The test fuse-links may be submitted to the test house already soldered to the test boards. However, some tests require fuses to be loose, e.g. "solderability" and "resistance to soldering heat" tests, while through-hole type "bend testing" has to be carried out before soldering. While it is considered acceptable for the test house to be able to solder the through-hole types to the test board for subsequent measurement of voltage drop, there is a difficulty with soldering SMD fuse-links that have been subjected to resistance to soldering heat onto a test board so that the voltage drop can be tested.

Some of the following is taken from IEC 60068-2-58 using "Group 3 Medium High Temperature Solder paste".

a) Choice of solder paste

1) The alloy composition to be used shall consist of 3,0 wt % Ag (silver), 0,5 wt % Cu (copper) and the remainder of Sn (tin); Sn96,5Ag3,0Cu0,5 is preferred. The solder alloys shall consist of 3,0 wt % to 4,0 wt % Ag, 0,5 wt % to 1,0 wt % Cu, and the remainder of Sn may be used instead of Sn96,5Ag3,0Cu0,5.

   – Solder powder

     The powder size shall be symbol 3, specified in Table 2 of 6.3.2 of IEC 61190-1-2.

     The shape of the solder powder shall be spherical.

   – Flux composition

     The flux to be used shall consist of 30 wt % polymerization rosin (softening point approximately 95 °C), 30 wt % dibasic acid degeneration rosin (softening point approximately 140 °C), 34,7 wt % diethylene glycol monobutyl ether, 0,8 wt % 1,3-diphenylguanidine- HBr, 0,5 wt % adipic acid (chlorine content less than 0,1 %) and 4 wt % stiffening castor oil.

   – Solder paste composition

     The solder paste to be used shall consist of 88 wt % solder powder and 12 wt % flux. The viscosity range shall be (180 ± 50) Pa·s.

2) The footprints shall be covered with a solder deposit. The thickness of the solder deposit shall be between 100 μm and 250 μm; the thickness shall be specified in the relevant specification

b) Preparation of the specimen

1) The specimen surface to be tested shall be in the "as received" condition and shall not be touched by fingers or otherwise contaminated.
2) The specimen shall not be cleaned prior to test. If required by the relevant specification, the specimen may be immersed in an organic solvent at room temperature for preconditioning.
3) Preconditioning

   Specimens, which need preconditioning, shall be pre-treated in accordance with the relevant specification.

c) Positioning of the specimen

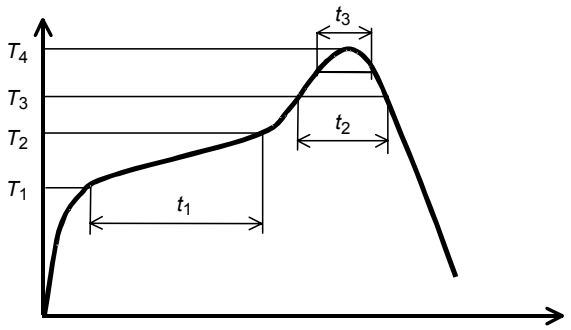
The specimen shall be placed symmetrically on its footprint,

d) Soldering

1) As long as the soldering conditions do not lead to a thermal load, which exceeds the SMD specification, any kind of reflow oven or vapour phase soldering oven may be used.
2) The parameters for reflow temperature are detailed in Figure A.1.

Key

T_1 Minimum preheating temperature
T_2 Maximum preheating temperature
T_3 Soldering temperature
T_4 Peak temperature
t_1 Preheating duration
t_2 Soldering duration
t_3 Peak temperature duration



T_1 °C	T_2 °C	t_1 s	T_3 °C	t_2 s	T_4 °C	t_3 s
150 ± 5	180 ± 5	60 to 120	225	20 ± 5	235	--

Figure A.1 – Parameters for reflow temperature

3) The reflow temperature specified is mentioned for wetting test condition of solder reflow method. Care should be taken that the typical soldering process temperature is 235 °C to 250 °C as mentioned in Table 1 of IEC 60068-2-58.
4) Care shall be taken that complete wetting is achieved.
5) The soldered area of the substrate shall be cleaned using 2-propanol (iso-propanol) or water to remove surplus flux. If necessary, the details of the cleaning method shall be specified in the relevant specification.
6) The solder fillet shall comply with the minimum requirements for the relevant joint given in IEC 61191-2.

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Bibliography

Add the following new reference:

IEC 61190-1-2:2007, *Attachment materials for electronic assembly – Part 1-2:Requirements for soldering pastes for high-quality interconnects in electronics assembly*

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(ETD 39)

Publication Unit, BIS, New Delhi