

JIS

JAPANESE INDUSTRIAL STANDARD

**Flexible printed wiring boards
—Single-sided, Double-sided**

JIS C 5017—1994

Translated and Published

by

Japanese Standards Association

Printed in Japan

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Flexible printed wiring boards
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1. Scope This Japanese Industrial Standard specifies single- and double-sided flexible printed wiring boards, mainly used for electronic apparatus (hereafter referred to as "flexible printed board").

The flexible printed boards dealt with here are single-sided flexible printed board having polyester film or polyimide film as the base material and double-sided flexible printed board having polyimide film as the base material, which are manufactured using copper-clad laminate, in accordance with subtractive process.

Remarks 1. The following standards are cited in this Standard:

JIS C 5016 Test methods for flexible printed wiring boards

JIS C 5603 Terms and definitions for printed circuits

JIS C 6471 Test methods of copper-clad laminates for flexible printed wiring boards

2. The International standards corresponding to this Standard are given below:

IEC 326-7 (1981) Printed boards. Part 7: Specification for single and double sided flexible printed boards without through connections

IEC 326-8 (1981) Printed boards. Part 8: Specification for single and double sided flexible printed boards with through connections

2. Definitions For the purposes of this Standard, in addition to the definitions specified in JIS C 5603, the following definitions apply:

(1) adhesive flow The ooze of adhesive on the conductor surface such as lands due to bonding of cover lay by means of heat and pressure.

(2) reinforcing material The laminated sheet, plastic sheet or metal sheet to be bonded to a part of flexible printed board by using an adhesive or pressure sensitive adhesive, to give rigidity to that part or to fix the board at the part.

(3) filiform burr The filiform burr produced at machining

3. Characteristics The characteristics of flexible printed boards, the test items and applicable test methods shall be as given in Table 1.

The test methods are based on JIS C 5016.

Table 1. Characteristics and test method

No.	Item	Characteristics	Test method (JIS C 5016)
1	Insulation resistance of surface layer	Shall be $5 \times 10^8 \Omega$ or over.	As specified in 7.6.
2	Voltage proof of surface layer	Shall not make flashover by a.c. applied voltage of 500 V.	As specified in 7.5.
3	Peeling strength	Shall be 0.49 N/mm or more.	As specified in 8.1.
4	Plating adhesion	Shall not be peeled off.	As specified in 8.4.
5	Solderability	To show superior solderability on 95 % or more of soldered area. However, it is not applicable for flexible printed board employing polyester film as base.	As specified in 10.4.
6	Resistance to flextural fatigue	Flexible printed board with cover lay shall satisfy the number of flextures at the flexing radius determined by the agreement between the parties concerned with acceptance.	As specified in 8.6.
7	Resistance to bend	Flexible printed board with cover lay shall satisfy the number of bends under the radius of curvature at the bending part and load determined by the agreement between the parties concerned with acceptance.	As specified in 8.7.
8	Climates resistance	Specimens shall be tested under the conditions selected from the test methods on the right, determined by the agreement between the parties concerned with acceptance, and shall comply with the characteristics of each test item, before and after this test.	As specified in 9.1, 9.2, 9.3, 9.4 and 9.5.
9	Resistance to thermal shock of copper plated through hole	Relative change in resistance of plated through holes of double-sided flexible printed board shall be not more than 20 %.	As specified in 10.2.

Table 1. (continued)

No.	Item	Characteristics	Test method (JIS C 5016)												
10	Resistance to burning	Specimen resistance to burning shall satisfy the appropriate value given below, after this test.	As specified in 6.8 of JIS C 6471.												
		<table><tr><th>Item</th><th>Criterion</th></tr><tr><td>(1) Duration of flaming</td><td>Within 10 s at each test</td></tr><tr><td></td><td>Total duration in 10 tests shall be within 50 s.</td></tr><tr><td>(2) Duration of flaming and glowing</td><td>Total duration of both burning at second test shall be within 30 s.</td></tr><tr><td>(3) Flaming or glowing to the grip or bench mark</td><td>No such burning</td></tr><tr><td>(4) Drip which ignites absorbent cotton</td><td>No such drip</td></tr></table>		Item	Criterion	(1) Duration of flaming	Within 10 s at each test		Total duration in 10 tests shall be within 50 s.	(2) Duration of flaming and glowing	Total duration of both burning at second test shall be within 30 s.	(3) Flaming or glowing to the grip or bench mark	No such burning	(4) Drip which ignites absorbent cotton	No such drip
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		(3) Flaming or glowing to the grip or bench mark		No such burning											
(4) Drip which ignites absorbent cotton	No such drip														
Remarks: In such cases that only one specimen out of five specimens in the above (1) to (4) does not satisfy criteria, or that total duration of flaming in 10 tests is 51 s to 55 s, retest shall be carried out. In the retest, all the specimens shall satisfy the criteria.															
11	Resistance to soldering heat	There shall be no blister or peel off. On the cover coat there shall be no discoloration harmful to practical use. There shall be no remarkable defect on symbol mark. This test is not applicable to flexible printed board employing polyester film as base.	As specified in 10.3.												
12	Resistance to chemicals	There shall be no blister or peel off. There shall be no remarkable defect on symbol mark.	As specified in 10.5.												

4. Dimensions

4.1 Grid dimensions

4.1.1 Basic grid As for grids of flexible printed board, the grid of metric system shall be used as the standard, and the grid of inch system shall be used only when compatibility with traditional product is necessary.

The basic grid dimensions shall be as follows:

Grid of metric system: 2.50 mm

Grid of inch system: 2.54 mm

4.1.2 Auxiliary grid If grid dimension smaller than that of basic grid of 4.1.1 is necessary, the following dimensions shall be used:

Grid of metric system: Unit of 0.5 mm (if further smaller unit is necessary, unit of 0.05 mm shall be used)

Grid of inch system: Unit of 0.635 mm

Remarks: Grids of an unit smaller than 0.05 mm or 0.635 mm shall not be used.

4.2 External dimensions The external dimensions shall be the dimensions specified separately by the agreement between the parties concerned with acceptance. The tolerances on external dimensions shall be ± 0.3 mm for an external dimension less than 100 mm and ± 0.3 % for that 100 mm or over.

4.3 Hole

4.3.1 Hole diameter and tolerance

- (1) Component hole In flexible printed boards, the minimum component hole diameter shall be 0.50 mm and the tolerances shall be ± 0.08 mm.
- (2) Via In the double-sided flexible printed board, the plated through hole used for via shall be circular hole only. The minimum hole diameter after plating shall be 0.50 mm and the tolerances shall be ± 0.08 mm.
- (3) Mounting hole
 - (a) Circular hole The minimum diameter of circular hole shall be 0.50 mm and the tolerances shall be ± 0.08 mm.
 - (b) Square hole The minimum dimensions of one side of the square hole shall be 0.50 mm and the tolerances shall be ± 0.08 mm.

4.3.2 Minimum distance between mounting hole end and board end The minimum distance between mounting hole end and board end shall be not less than 2.0 mm.

4.3.3 Misalignment of hole position The misalignment of a finished hole position and the designed hole position shall be not more than 0.3 mm. However, via is excluded.