

# JIS

## JAPANESE INDUSTRIAL STANDARD

**Copper-clad laminates for  
flexible printed wiring boards  
(Polyester film, Polyimide film)**

**JIS C 6472—1995**

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Copper-clad laminates  
for flexible printed wiring boards  
(Polyester film, Polyimide film)

C 6472-1995

1. Scope This Japanese Industrial Standard specifies the copper-clad laminates to be used for flexible printed wiring boards (employing polyester film or polyimide film as the base) (hereafter referred to as "copper-clad laminates").

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

- JIS C 5001 General rules for electronic components
  - JIS C 5603 Terms and definitions for printed circuits
  - JIS C 6471 Test methods of copper-clad laminates for flexible printed wiring boards
  - JIS C 6480 General rules of copper-clad laminates for printed wiring boards
  - JIS C 6512 Electrodeposited copper foil for printed wiring boards
2. The International standards corresponding to this Standard are given below.
- IEC 249-2-8 (1987) Base materials for printed circuits.  
Specification No. 8: Flexible copper-clad polyester (PETP) film.
  - IEC 249-2-13 (1987) Base materials for printed circuits.  
Specification No. 13: Flexible copper-clad polyimide film, general purpose grade.
  - IEC 249-2-15 (1987) Base materials for printed circuits.  
Specification No. 15: Flexible copper-clad polyimide film, of defined flammability.

2. Definitions For the purpose of this Standard, in addition to the definitions given in JIS C 5001 and JIS C 5603, the following principal definitions apply.

- (1) MD The lengthwise direction at the time of continuous manufacture of base films (hereafter referred to as "films"), copper foils or copper-clad laminates.

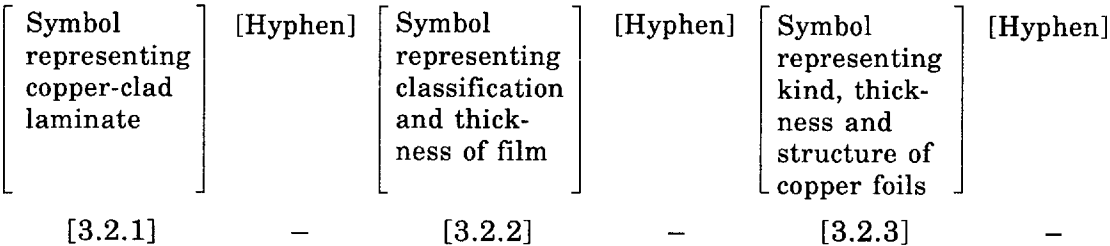
Remarks: MD is the abbreviation of "machine direction".

- (2) TD Cross direction at the time of continuous manufacture of films, copper foils or copper-clad laminates. Direction perpendicular to MD.

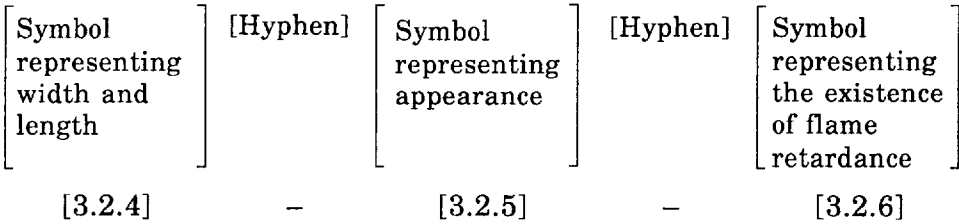
Remarks: TD is the abbreviation of "transverse direction".

3. Type designation

3.1 Structure of type designation      The type designation shall be structured in the following arrangement:



Example:



Example:



3.2 Classification and symbols

3.2.1 Copper-clad laminates      The symbol representing copper-clad laminate shall be CLF in English capital letters.

3.2.2 Films      Symbols representing classification and thickness of films are as follows:

- (1) Classification      The films shall be classified into the following 3 classes and their symbols are as follows:  
PET: polyester film  
PIA: pyromellitic acid type polyimide film  
PIB: biphenyl tetracarboxylic acid type polyimide film
- (2) Thickness      Symbols representing the thickness of films shall be as given in Table 1.

Table 1. Thickness of films

Unit:  $\mu\text{m}$ 

| PET    |           |            | PIA    |           |            | PIB    |           |            |
|--------|-----------|------------|--------|-----------|------------|--------|-----------|------------|
| Symbol | Thickness | Tolerance  | Symbol | Thickness | Tolerance  | Symbol | Thickness | Tolerance  |
| —      | —         | —          | 12.5   | 12.5      | $\pm 2.0$  | 12.5   | 12.5      | $\pm 2.0$  |
| —      | —         | —          | 17.5   | 17.5      | $\pm 3.0$  | —      | —         | —          |
| —      | —         | —          | —      | —         | —          | 20     | 20.0      | $\pm 3.0$  |
| 25     | 25.0      | $\pm 2.5$  | 25     | 25.0      | $\pm 3.0$  | 25     | 25.0      |            |
| 38     | 38.0      | $\pm 3.8$  | —      | —         | —          | —      | —         | —          |
| 50     | 50.0      | $\pm 5.0$  | 50     | 50.0      | $\pm 6.0$  | 50     | 50.0      | $\pm 6.0$  |
| 75     | 75.0      | $\pm 7.5$  | 75     | 75.0      | $\pm 8.0$  | 75     | 75.0      | $\pm 8.0$  |
| 100    | 100.0     | $\pm 10.0$ | —      | —         | —          | —      | —         | —          |
| 125    | 125.0     | $\pm 12.5$ | 125    | 125.0     | $\pm 13.0$ | 125    | 125.0     | $\pm 13.0$ |

For the thickness other than those mentioned above, the numerical value of the nominal film thickness expressed in micrometer ( $\mu\text{m}$ ) shall be employed as the thickness symbol.

**3.2.3 Classification, thickness and structure of copper foil** Symbols representing kind, thickness and structure of copper foils are as follows:

(1) Classification

- (a) Electrodeposited copper foil The symbol representing electrodeposited copper foil shall consist of an English capital letter E, and the foil shall be classified as stated below based on the provision of 3.2.1 in JIS C 6512.

E1: standard electrodeposited copper foil

E2: electrodeposited copper foil with high elongation at room temperature

E3: electrodeposited copper foil with high elongation at 180°C

- (b) Rolled copper foil The symbol representing rolled copper foil shall consist of an English capital letter R, and the foil shall be classified as stated below:

R1: cold rolled copper foil (without annealing)

R2: lightly cold rolled copper foil (without annealing)

R3: rolled and annealed copper foil

- (2) Thickness The symbols representing the thickness of copper foils shall be as given in Table 2, based on the provision of 3.2.2 (1) in JIS C 6512.