

## MATERIAL STRENGTH TEST

**i1**

### Shimadzu Universal Testing Machines, Model Autograph, highly appreciated in Quality Inspection of Printed Circuit Boards

The Shimadzu Autograph is a high performance universal testing machine with computerized system control for versatile use in the evaluation of strength properties and mechanical behaviors of various materials such as metal, rubber, plastic, textile fibers, electric components, medicines, foods, etc.

It is an epoch-making machine in that all operations are computer controlled, from load control and measurement to data indication and processing, for the best performance in quality control as well as research and development.

- **Peeling test of copper plate on a printed circuit board (copper plated laminate for printed circuit board – epoxy glass substrate)**

A test piece is prepared from a printed circuit board machined to the size shown in **Fig.1**. The copper foil is cut at its center with a knife in a belt shape of 10mm  $\pm$  0.1mm wide, and the rest of the foil at both sides is removed. This test piece is fixed onto a fixture with either end of the copper foil belt peeled and held with a grip at an appropriate length. As shown in **Fig.2**, the copper foil is peeled in the tensile direction perpendicular to the copper foil surface to a distance of about 50mm at a continuous rate of 50mm/min. The minimum value of the load applied in this process is represented in terms of 5N/m as the peeling strength.

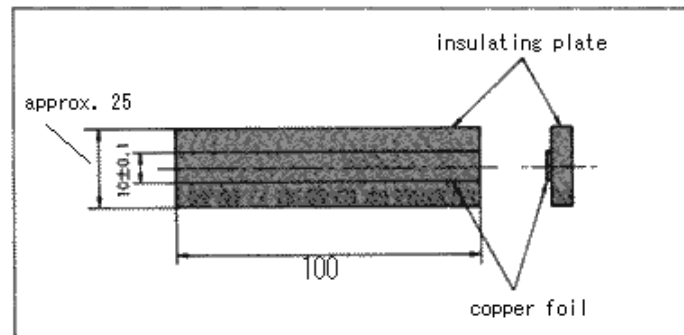


Fig.1 Test Piece Cut Out of a Printed Circuit Board

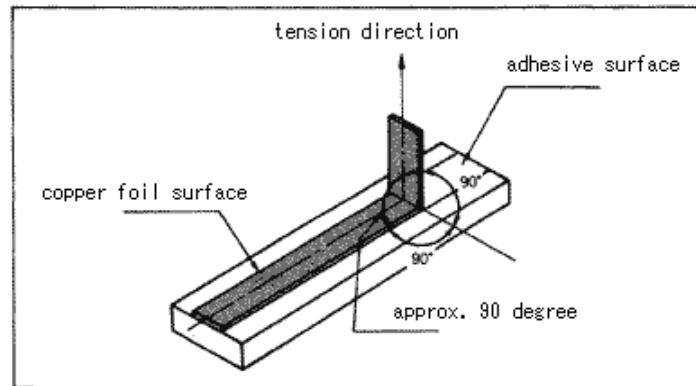


Fig.2 Direction of Tensile Force



Fig.3 Copper Foil Peeling Test

**Fig.4** shows the record of a peeling test conducted on a copper foil of a printed circuit board.

The mean values of the upper and lower load limits and the mean load value are automatically calculated while each load value for peeling is also recorded automatically.

**Fig.5** shows the record of a copper foil peeling test conducted after a heat resistance test (the foil was placed in solder of temperature 247 degree Celsius for a duration of 9.5 sec.) with an aim to test the deterioration in adhesive strength of the foil caused by the blistering and peeling of solder on the bonded foil surface.

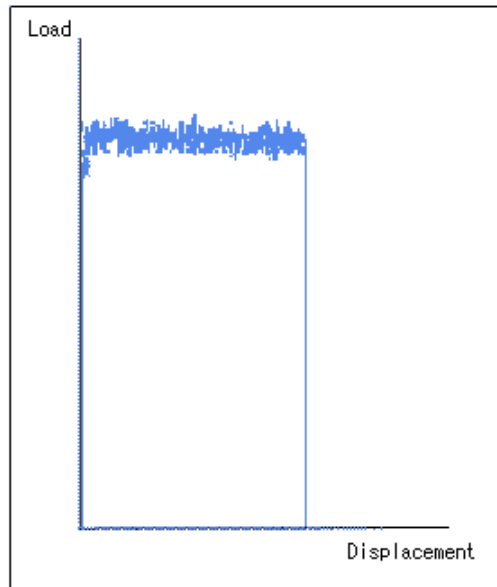


Fig.4 Copper Foil Peeling Test

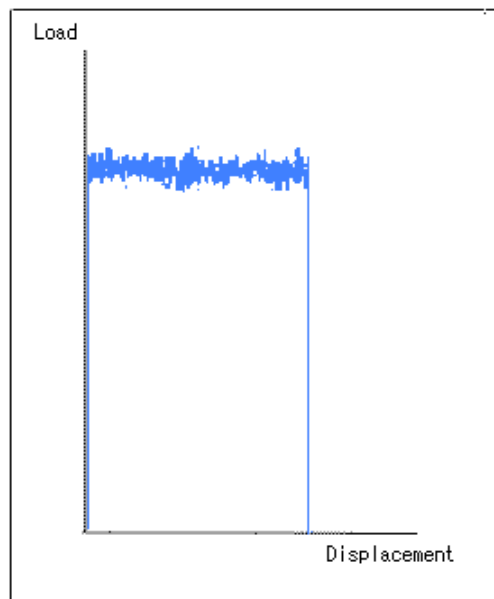


Fig.5 Copper Foil Peeling Test after Heat Resistance Test

- **Japan Industrial Standard C6481-1796: Test method of copper-clad laminates for printed wiring boards**

Demand for copper plated laminates has been increasing year after year. JIS specifies the procedure for testing them.

It includes a provision specifying the procedure for measuring the minimum load per unit width when peeling a copper foil at an angle perpendicular to the insulating plate with a tensile strength testing machine that can maintain a crosshead rate of 50mm/min. and error of around  $\pm 1\%$  of the indicated value at a given effective measuring range. Testing machines that satisfy these requirements and meet JIS specifications for printed circuit board peeling test are available from Shimadzu Corporation.

\* Please be advised that data obtained before the implementation of the current Weights and Measures Law may be presented in terms of gravimetric unit.

**SHIMADZU CORPORATION International Marketing Division**

3,Kanda-Nishikicho 1-chome, Chiyoda-ku,Tokyo 101-8448,  
JapanPhone: 81(3)3219-5641 Fax: 81(3)3219-5710  
Cable Add,;SHIMADZU TOKYO

**SHIMADZU SCIENTIFIC INSTRUMENTS, INC.**

7102, Riverwood Drive, Columbia, Maryland 21046, U.S.A.  
Phone: 1(410)381-1227 Fax: 1(410)381-1222 Toll Free:1(800)477-1227

**SHIMADZU DEUTSCHLAND GmbH**

Albert-Hahn-Strasse 6-10, D-47269 Duisburg, F.R. Germany  
Phone: 49(203)7687-0 Fax: 49(203)7666-25

**SHIMADZU (ASIA PACIFIC) PTE LTD.**

16 Science Park Drive #01-01,Singapore Science Park, Singapore 118227, Republic of Singapore  
Phone: 65-778-6280 Fax: 65-779-2935

**SHIMADZU SCIENTIFIC INSTRUMENTS(OCEANIA)PTY. LTD.**

Rydalmere Business Park, Unit T, 10-16, South Street Rydalmere, N.S.W. 2116, Australia  
Phone: 61(2)9684-4200 Fax: 61(2)9684-4055

**SHIMADZU DO BRASIL COMERCIO LTDA.**

Rua Cenzo Sbrighi, 25 CEP 05036-010 Agua Branca, Sao Paulo, BRAZIL  
Phone: 55(11)3611-1688 Fax: 55(11)3611-2209

**SHIMADZU (HONG KONG) LIMITED.**

Suite 1028, Ocean Centre, Harbour City, Tsim Sha tsui, Kowloon, HONG KONG  
Phone: 852(2375)4979 Fax: 852(2199)7438

**Overseas Office**

Istanbul,Beijing,Shanghai,Guangzhou,Shenyang,Chengdu,Moscow