The Institute for Interconnecting and Packaging Electronic Circuits
2215 Sanders Road • Northbrook, IL 60062-6135

IPC-TM-650
TEST METHODS MANUAL

Number	
2.3.3	
Subject	
Chemical Resistance of Insulating Materials	
Date	Revision
2/78	**A**
Originating Task Group	
N/A	

1 Scope This method is designed for use in determining the chemical resistance of all substrates and plastic materials in PWBs.

2 Applicable Documents None

3 Test Specimen

3.1 Test specimen, 75 mm x 25 mm x thickness of the material with the cut edges smoothed by machining or fine sandpaper.

4 Apparatus

4.1 Accurate chemical balance

4.2 Suitable micrometers

4.3 Glass containers for test specimens

5 Procedure

5.1 Preparation of Reagents Mix sulfuric acid (30%) by slowly adding 199 milliliters (366g) of H_2SO_4 (sp. gr. 184) to 853 milliliters of water. Use sulfuric acid (3%) and slowly add 16.6 milliliters (30.6g) of H_2S0_4 (sp. gr. 1.84) to 988 milliliters of water. Use sodium hydroxide solution (10%) and dissolve 111 grams of NaOH in 998 milliliters of water. Use ethyl alcohol (50%) and add 598 milliliters (482g) of 95% undenatured ethyl alcohol to 434 milliliters of water. Acetone. Ethyl acetate, C. P. ethylene dichloride. Carbon tetrachloride, C. P. toluene. Heptane 1 commercial grade, boiling range 90°C to 100°C. Use sodium chloride solution (10%) and add 107 grams of NaCl to 964 milliliters of water. Use phenol solution (5%) and dissolve 47 grams of carbolic acid crystal, USP, in 950 milliliters of water. Use nitric acid (10%) and add 108 milliliters (153g) of $HN0_3$ (sp. gr. 1.42) to 901 milliliters of water. Use hydrochloric acid (10%) and add 239 milliliters (238g) of HCl (sp. gr. 1.19) to 764 milliliters of water. Use acetic acid (5%) and add 48 milliliters (50.5g) of glacial acetic acid, C.P. Use ammonium carbonate solution (2%) and add 55 grams of $Na_2CO_3H_20$ to 964 milliliters of water. Use ammonium hydroxide (10%) and add 375 milliliters (336g) of NH_40H (sp. gr. 0.90) to 622 milliliters of water. Use hydroxperoxide solution (3%, or USP 10 volume) and add 98 milliliters (108g) of commercial grade (100 volume or 28%) hydrogen peroxide to 901 milliliters of water. Use citric acid (10%) and dissolve 104 grams of citric acid crystal in 935 milliliters of water.

5.2 Condition The specimen shall be conditioned for at least 48 hours in atmospheric conditions of 23°C ± 1°C and 50% ± 4% RH, then weighed separately. The thickness of each specimen at the center and the length and width or two diameters at right angles to each other shall be measured to the nearest 0.025 mm.

5.3 Exposure Place the specimens on the edge in the container so that it is supported at an angle by the bottom and side wall of the container, then totally immerse each specimen in separate containers in approximately 60 milliliters of reagent for seven days at 23°C ± 1.1°C. The reagents shall be stirred every 24 hours by moderate manual rotation of the container. Following the immersion period, the specimens shall be removed, washed in running water, wiped with a dry cloth, and immediately weighed in a closed weighing bottle. Each shall have the thickness measurement made at the centers and the length and the width.

5.4 Evaluation of Test Report the percent loss or gain in weight calculated to the nearest 0.01% and the increase or decrease in length and width or thickness. Include the general character of the specimen after immersion and the type of reagent used.

6 *Notes*

6.1 In making tests for periods longer than seven days, it is recommended that the test be run four times, made up of increments of four weeks.

6.2 All immersion testing shall be performed in a ventilated fume hood.