CHAPTER I

INTRODUCTION

1.1. Background soldering

Soldering is an important technique in the assembly of electronics products. In electronics mass production hundreds of millions of solder joints is being formed daily. A standard radio receiver contains about 500 joints, a black and white television set about 1000, and a color television set about 2000. Large computers and telephone systems have over 10^5-soldered joints.[1]

Soldering is basis and importance for electronic industry and flux is used in soldering process for joint the electrical part and PCB board together. Nowadays, the trend of electronic equipment is driven to very small part such as mobile telephone, computer and digital camera.

The transition of the electronics equipments for the most recent 20 years, changes from the analog discrete such as TVs and VCRs to the digital discrete sound and texts such as CDs and PDs. Then, it changes to the digital video such as DVCs and DVDs. Coming next is the digital network such as digital TVs, third generation mobile phones, intelligent transport system (ITS), home information infrastructure (HII), and so on.

TVs changing to digital TVs will be the window to the network at home. Mobile phones will be the personal windows to the network. Note, PCs will be the portal site to the network. These three products will be major items up to the year 2010, and the total production will be over 1 billion sets per year in the world.[2]

These are development from through hole technology to surface mounting technology. Development in mounting technology is governed by trends in electronics, i.e., progressive miniaturization. Miniaturization is a development driven by the desire of system makers for lower cost/higher performance. The IC houses must be following and subsequently also the mounting shops and the development of soldering material must be as fast as mounting technology especially solder and soldering paste flux which shown in figure 1.1.

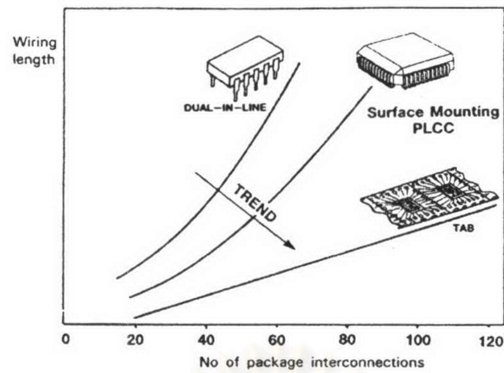

Figure 1.1 Qualitative indication of increase of substrate interconnection length of three components with increasing number of package lead-outs[1]

The basic constituents involved in the making of a soldered joint composed of solder alloy, flux, heat and basic metal. The solder and flux have many types for selection and solder paste is one kind of soldering material.

Solder paste is widely used for hybrid circuit fabrication or printed wiring boards. The packaging density of such boards is increasing and the size of the parts used is getting smaller year after year. As the surface mount technology developed, device were introduced with leads spaced only 0.64 mm apart. Today, devices are in use with only 0.5 mm pitch, and the tendency is still to lower the space between leads.[3]

Solder paste is a homogenous, stable suspension of solder particles in a solder paste flux and has many applications in the electronics industry, particularly in the manufacture of printed circuit boards (PCB). Reflow soldering is used in the automated manufacture of PCB, wherein electronic components are surface mounted on PCB to which a solder paste has previously been applied by a method such as screen printing, stenciling or dispensing. The PCB is then subjected to a sufficiently high temperature, to cause the solder paste flux and the solder particles to liquefy and to join the components in place on the PCB. The heat can be supplied by, for example, infrared, heated conveyor belt or convective means.

The quality of solder paste depends on the solder powder, resin, solvent, activator, thixotropic agent and the flux, which consists of other additives. In line with the tendency toward smaller-sized components and increasing packaging density, there has been an increased demand for solder paste that makes fine line printing possible.[3]

1.2.Objectives and scope of this research

1.2.1. Objectives

1.2.1.1. To develope the solder paste flux using rosin, solvent, activator and thickening agent.

1.2.1.2. To investigate the quality of developed solder paste fluxes and storage conditions.

1.2.2. Scope of research

1.2.2.1. Literature survey of relevant research works.

1.2.2.2. Development of solder paste flux using the following substrate:

1.2.2.2.1. Colophony such as ww rosin, hydrogenated rosin

1.2.2.2.2. Solvent such as PEG 200, PEG300, toluene, 2-propanol, propylene glycol etc.

1.2.2.2.3. Activators such as succinic acid, adipic acid, ethylammonium chloride etc.

1.2.2.2.4. Thickening agent such as Ozokerite

1.2.2.3. Investigation on the quality of solder paste flux by the following item:

1.2.2.3.1. viscosity test by Brookfield digital viscometer model DV-I+ Version 3.2

1.2.2.3.2. tackiness test using the Singapore Asahi Method.

1.2.2.3.3. electrical insulation resistance test using the method of JIS Z 3284

1.2.2.3.4. corrosive test using the method of IPC TM-650

1.2.2.3.5. slump in heating test using the method of JIS Z 3284

1.2.2.3.6. wetting and dewetting effect test using the method of JIS Z 3284

1.2.2.4. Investigation on the effect of storage temperature of solder paste flux at the following temperature:

1.2.2.4.1. 0-10 ^{O}C

1.2.2.4.2. 11-35 ^{O}C

1.2.2.5. Summarizing of the results.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย