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Intermetallic identification in ball grid array (BGA) components of printed circuit boards (PCB) using the corss-section technique

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ssembling and soldering Surface Mount Technology (SMT) components on printed circuit boards is a painstaking process where microcomponents are inserted into printed circuit boards quite accurately. The need for smaller and smaller products with diverse functionalities requires better attention to products. The evolution of technology in electronic components of these products provides the need for a miniaturization of components and an increase in operational performance. This results in a trend by electronic devices towards smaller, lighter devices with increased functionality (Marques-Costa et al., 2016). The miniaturization of electronic components makes the assembly and welding processing of these components more complex and therefore requires an increased level of product quality (Rosa et al., 2017). Because it becomes a difficult process to identify and prevent failures in the welding process of electronic components, many companies ignore quality levels in the welding process of components (Marques-Costa et al., 2016). Knowledge of product quality is extremely important, because the more an organization invests in preventive tasks, the fewer failures will occur in the process and the more productivity it becomes (Wenzel and Türk, 2014). In the assembly of SMT components for the production of PCB boards, it is important to characterize the failures that arise during the soldering process of components in order to reduce defects and, in this way, improve the level of product quality. During the process of assembling and soldering SMT components on printed circuit boards, several factors can cause defects in the soldered joint of electronic components. The factors that can influence the quality of the welded joint are the metal alloys of the weld, board design, component, weld-substrate interface, processes and service conditions (John Lau, C. P Wong, John L. Prince, 1998). According to Hwang (1996), ensuring the integrity of a welded joint shows the factors that affect weldability and processes in component assembly. The objective of this work would be to identify the defects that arise during the welding process as well as the welding materials, and consequently their possible causes, some techniques can be used with the aid of specific equipment and procedures. According to (Strauss, 1998), (Hwang, 1996), (Manko, 2001), (Prasad, 1997), (John Lau, C. P Wong, John L. Prince, 1998), (Hwang, 2005), (James J. Licari, 1998) the most common defects in welded joints of SMT components are voids, cracks, lack of weld, cracks and their main inspection methods are: X-rays, Mechanical Tensile Test and Crosssection Metallography.