ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®

IPC-9194

Implementation of Statistical Process Control (SPC) Applied to Printed Board Assembly Manufacture Guideline

Developed by the Statistical Process Control Subcommittee (7-22) of the Process Control Management Committee (7-20) of IPC

Users of this publication are encouraged to participate in the development of future revisions.

Contact:

IPC
3000 Lakeside Drive, Suite 309S
Bannockburn, Illinois
60015-1219
Tel 847 615.7100
Fax 847 615.7105

Table of Contents

Figures

Tables

Implementation of Statistical Process Control (SPC) Applied to Printed Board Assembly Manufacture Guideline

1 SCOPE

The IPC-9194 should be used in conjunction with IPC-9191. The IPC-9191 provides general guidelines for implementing SPC in electronics industry.

This standard is intended to aid in interpretation of the requirements in IPC-9191 specifically for Printed Board Assembly (PBA) manufacture. This standard promotes process thinking and control of process inputs, in-process parameters and process outputs, including product parameters. The standard organizes various aspects of process control in the Plan, Do, Check and Act (PDCA) cycle.

1.1 Purpose Purpose of the IPC-9194 is to establish practical guidelines for implementation of SPC in the electronics manufacturing operations for continually improving processes and reducing waste.

The standard includes establishing conditions for SPC, implementation of SPC and sustaining SPC. The Implementation phase includes the following elements:

1. Preparation
2. Set up and Process Characterization
3. Practicing SPC
4. Monitoring Effectiveness of SPC
5. Improving Process Capability

Successful implementation of SPC is contingent on effectiveness of the quality management system that includes controlled documentation, calibration, corrective action and management review elements.

1.2 Interpretation ''Should'' and ''may'' are used whenever it is necessary to express nonmandatory provisions.

''Will'' is used to express a declaration of purpose.

''Applicable'' reflects mutual agreements between customer and organizations.

''Documentation'' is factual or substantial support for statement made.

''References'' are intended to clarify and to add information not to be used as auditable criteria. Any reference is noted by the author's last name, followed by the year of publication in parenthesis.

''Examples'' provide additional information only and are not to be interpreted as requirements. These examples are shown in the outlined sections.

''Where appropriate'' indicates the organization is expected to provide rationale for appropriateness.

2 NORMATIVE REFERENCES

2.1 IPC[1]

IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits

IPC-9191 General Guidelines for Implementation of Statistical Process Control

IPC-9199 Statistical Process Control (SPC) Quality Rating

2.2 International Organization for Standardization[2]

ISO 9001:2000 Quality Management System Requirements

ISO 10012 Calibration System Requirements

ISO 10017 Guidance on Statistical Techniques for ISO 9001:2000

ISO 11462-1 Guidelines for Implementation of Statistical Process Control (SPC) - Part 1: Elements of SPC

2.3 Automotive Industry Action Group[3]

AIAG-APQP-2 Advanced Product Quality Planning and Control Plan

AIAG-MSA-3 Measurement Systems Analysis

3 TERMS AND DEFINITIONS

Terms and definitions **shall** be in conformance with IPC-T-50 and as defined in IPC-9191.

4 SPC OBJECTIVES

4.1 General and Specific Objectives General objectives of Statistical Process Control (SPC) are: Increasing knowledge about the process; steering a process to behave in the desired way; reducing variation of final-product parameters, or in other ways improving performance of a process.

1. www.ipc.org
2. www.iso.org
3. www.aiag.org