

A Statistical Approach to Reduce the Manufacturing Process Qualification Cost and Sample Size

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Abstract

Process qualification is a common norm in the manufacturing/ consumer electronics industry. With product lifecycle becoming shorter, we see New product Introductions at a rapid pace today than anytime before. New products means setting up more and more new processes, machines, and production lines. With Product quality becoming the centre of attention for most organisations, there has been increasing demand for optimization of statistical process qualifications. Generally, to qualify a new manufacturing process, the Quality engineers follow a statistical approach by measuring the performance of a specific quality of parts. However, in some scenarios like in High volume manufacturing, we might encounter lots of new processes under multiple product configurations which make statistical qualifications a huge cost adder given so many quantities to test plus they also are a cause of manufacturing waste if the parts are not intended to be customer shipped. In this paper, we propose a new solution that leverages a 2 step testing method mainly based on binomial distribution and the main idea is if there is a process that sees early failures, we may be able to identify it with initial samples without the need to undergo complete qualification. Further, we also prove through results that we can achieve 18-25% reduction in samples while keeping same statistical confidence.