Capability testing based on subsamples: a case on photolithography process control in wafer fabrication

Mou-Yuan Liao,He-Yau Kang,李欣怡,Chien-Wei Wu
Industrial Engineering and System Management
Management
amylee@chu.edu.tw

Abstract

Photolithography is considered as the bottleneck in semiconductor manufacturing, and a good control of critical dimension, alignment accuracy and photoresist thickness is essential for maintaining a high quality level of wafers. In this study, a photolithography process in a semiconductor factory is investigated, and the process performance of critical dimension, alignment accuracy and photoresist thickness measurement is tested based on the process capability index . Critical values required for hypothesis testing are obtained based on subsamples. This investigation is useful to the practitioners for making reliable decision in capability determination. By applying our research results to analyze the process performance with the three critical parameters, a production department can trace and improve the photolithography process.

Keyword：Photolithography; critical dimension; critical value; alignment accuracy; photoresist thickness; process capability; subsamples.