

ABSTRAK

Novia Anggraini. Analisis Kualitas Produk kWh Meter Berdasarkan Hasil Uji
Menggunakan *Statistical Process Control* dan *Process Capability Analysis* di PT X
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Kualitas produk merupakan faktor penentu daya saing perusahaan manufaktur, khususnya dalam industri alat ukur listrik seperti kWh meter. Penelitian ini bertujuan untuk menganalisis kondisi aktual proses produksi kWh meter menggunakan metode *Statistical Process Control* (SPC), menilai kemampuan proses dalam memenuhi spesifikasi kualitas menggunakan *Process Capability Analysis* (PCA), serta mengidentifikasi faktor-faktor penyebab kecacatan produk. Objek penelitian adalah produk kWh Meter Prabayar tipe DDSY 837 yang diproduksi di PT X dengan periode pengamatan Januari 2025 hingga Mei 2026 yang mencakup 17 periode produksi. Data yang digunakan terdiri dari data atribut berupa jumlah produksi dan jumlah defect sebanyak 852.488 unit produksi dengan 7.102 unit *defect*, serta data variabel berupa 504 data nilai *error* hasil pengujian produk. Analisis SPC dilakukan menggunakan peta kendali P (*P-Chart*), sedangkan analisis PCA dilakukan setelah data dinyatakan memenuhi uji kecukupan dan uji normalitas Anderson-Darling dengan nilai *P-Value* sebesar 0,053. Hasil analisis SPC menunjukkan bahwa proses produksi belum berada dalam kondisi terkendali secara statistik, dengan nilai *Center Line* sebesar 0,00833, proporsi *defect* tertinggi pada Maret 2026 sebesar 1,35%, dan terendah pada April 2026 sebesar 0,55%. Hasil analisis PCA menunjukkan nilai *Cp* sebesar 2,52 dan *Cpk* sebesar 1,62, yang berarti proses berada dalam kategori capable dan mampu memenuhi batas spesifikasi yang ditetapkan perusahaan dengan $LSL = -1$ dan $USL = 1$. Identifikasi penyebab kecacatan menggunakan *Fishbone Diagram* dan *Tree Diagram* menghasilkan empat faktor utama, yaitu *Machine*, *Man*, *Method*, dan *Material*. Usulan perbaikan disusun menggunakan pendekatan 5W1H yang meliputi verifikasi akurasi alat uji, *refreshment training* operator, evaluasi SPC berkala, dan inspeksi material berdasarkan *batch*.

Kata Kunci: *Statistical Process Control, Process Capability Analysis, Fishbone Diagram, kWh Meter, Pengendalian Kualitas*

ABSTRACT

Novia Anggraini. *Quality Analysis of kWh Meter Products Based on Test Results Using Statistical Process Control and Process Capability Analysis at PT X*
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Product quality is a key determinant of competitiveness in manufacturing companies, particularly in the electrical measurement instrument industry such as kWh meters. This study aims to analyze the actual condition of the kWh meter production process using the Statistical Process Control (SPC) method, assess the process capability in meeting quality specifications using Process Capability Analysis (PCA), and identify the factors causing product defects. The research object is the Prepaid kWh Meter type DDSY 837 manufactured at PT X, with an observation period from January 2025 to May 2026 covering 17 production periods. The data used consisted of attribute data in the form of production volume and defect quantity, totaling 852,488 production units with 7,102 defective units, as well as variable data comprising 504 error value measurements obtained from product testing. SPC analysis was conducted using a P-Chart, while PCA was performed after the data fulfilled the data sufficiency test and the Anderson-Darling normality test with a P-Value of 0.053. The results of SPC analysis indicate that the production process has not yet reached a statistically controlled condition, with a Center Line value of 0.00833, the highest defect proportion occurring in March 2026 at 1.35%, and the lowest in April 2026 at 0.55%. The PCA results show a Cp value of 2.52 and a Cpk value of 1.62, indicating that the process is in the capable category and is able to meet the company's specification limits of LSL = -1 and USL = 1. The identification of defect causes using a Fishbone Diagram and Tree Diagram revealed four main factors, namely Machine, Man, Method, and Material. Improvement proposals were developed using the 5WH approach, including test equipment accuracy verification, operator refreshment training, periodic SPC evaluation, and batch-based material inspection.

Keywords: *Statistical Process Control, Process Capability Analysis, Fishbone Diagram, kWh Meter, Quality Control*