# ABSTRAK

## OPTIMALISASI KINERJA MESIN PELEBUR LIMBAH PLASTIK DENGAN VARIASI SUHU 200°$C$, 210°$C$, DAN 220°$C$ TERHADAP KUALITAS LELEHAN PLASTIK UNTUK PEMBUATAN GENTENG POLIMER

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**(2025: xvi + 55 Halaman, 11 Gambar, 9 Tabel, 5 Lampiran)**

Permasalahan pengelolaan limbah plastik yang semakin meningkat mendorong perlunya inovasi dalam proses daur ulang, salah satunya melalui pengembangan mesin pelebur limbah plastik. Penelitian ini betujuan untuk menganalisis pengaruh variasi suhu terhadap kualitas lelehan plastik yang dihasilkan serta menentukan suhu optimal pada mesin daur limbah plastik. Selain itu, penelitian ini juga mengevaluasi konsumsi energi pada mesin daur ulang tersebut. Penelitian dilakukan dengan metode eksperimen menggunakan pendekatan kuantitatif. Suhu pelelehan divariasikan pada 200°C, 210°C, dan 220°C dengan waktu penahaan masing-masing selama 20 dan 30 menit. Kualitas lelehan diukur melalui uji kekerasan menggunakan metode VIcker (HV). Data yang diperoleh dianalisis secara statistik menggunakan metode ANOVA dua arah (Two-Way ANOVA**)**. Hasil penelitian menunjukkan bahwa baik suhu maupun waktu pemanasan berpengaruh signifikan terhadap kualitas lelehan. Nilai kekerasan tertinggi diperoleh pada suhu 220°C dengan waktu 30 menit, yaitu sebesar 130,75 HV. Namun, suhu tinggi ini berisiko menyebabkan degradasi termal pada mesin dalam jangka panjang.

**Kata Kunci: Mesin Pelebur, Limbah Plastik, Suhu, Lelehan Plastik, Genteng Polimer**

# ABSTRACT


**OPTIMIZING THE PERFORMANCE OF A PLASTIC WASTE MELTING MACHINE USING TEMPERATURE VARIATIONS OF 200°C, 210°C, AND 220°C TO IMPROVE THE QUALITY OF MELTED PLASTIC FOR POLYMER ROOF TILE PRODUCTION**

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**(2025: xvi + 55 Halaman, 11 Gambar, 9 Tabel, 5 Lampiran)**

The increasing problem of plastic waste management has driven the need for innovation in the recycling process, one of which is through the development of a plastic waste melting machine. This study aims to analyze the effect of temperature variations on the quality of the resulting melted plastic and determine the optimal temperature in a plastic waste recycling machine. In addition, this study also consumes energy in the recycling machine. The study was conducted using an experimental method using a quantitative approach. The melting temperature was varied at 200°C, 210°C, and 220°C with holding times of 20 and 30 minutes, respectively. The quality of the melt was measured through a hardness test using the Vickers (HV) method. The data obtained were explained statistically using the Two-Way ANOVA method. The results showed that both temperature and heating time significantly influenced the quality of the melt. The highest hardness value was obtained at a temperature of 220°C with a time of 30 minutes, namely 130.75 HV. However, this high temperature risks causing thermal degradation of the machine in the long term.



**Keywords:** ***Melting Machine, Plastic Waste, Temperature, Melted Plastic, Polymer Roof Tiles***