

# **ANALISIS SIFAT MEKANIK PENAMBAHAN UNSUR TEMBAGA PADA ALUMINIUM 1100**

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## **Abstrak**

Tujuan melakukan pengujian ini adalah melihat dan menganalisa pengaruh penambahan unsur tembaga dari material aluminium 1100 melalui pengujian sifat mekanik, nantinya akan dibandingkan aluminium tanpa penambahan dan aluminium dengan penambahan. Dalam penelitian ini, material aluminium 1100 dilebur menggunakan media Furnace Elektrik temperatur 900 °C dan varian penambahan tembaga (Cu) 0%, 3%, dan 6%. Uji kekerasan menggunakan metode Vickers berstandar ASTM E92 dengan beban 10 Kgf, Uji tarik menggunakan spesimen berstandar ASTM E8 berbentuk plat, dan pengujian metalografi dengan menggunakan mikroskop optik perbesaran 50 kali. Hasil pengujian kekerasan menunjukkan variasi penambahan unsur tembaga (Cu) 3% mendapat nilai tertinggi yaitu rata-rata 109,37 HV, Terendah variasi 0% sebesar rata-rata 79,2 HV dan nilai kekerasan menurun di variasi 6% yaitu rata-rata 93,6 HV. Hasil pengujian tarik pada 0% tembaga memiliki kekuatan tarik tertinggi sebesar 157 MPa dan terendah pada penambahan 6% tembaga yaitu 127 MPa, lalu pada penambahan 3% tembaga mendapatkan 118 MPa untuk kekuatan tariknya. Pengamatan dari metalografi mendapatkan hasil bahwa semakin banyak batas butir akan menambah kekuatan material.

**Kata Kunci** : Aluminium, Sifat Mekanik, Uji Kekerasan Vickers, Uji Kekuatan Tarik, Metalografi

# ANALYSIS OF MECHANICAL PROPERTIES FOR ADDITION OF COPPER ELEMENTS IN ALUMINUM 1100

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## *Abstract*

*The purpose of conducting this test is to look at and analyze the effect of adding copper elements from aluminum material 1100 through testing the mechanical properties, later it will be compared to aluminum without additions and aluminum with additions. In this study, 1100 aluminum material was melted using Electric Furnace with temperature 900 °C and addition variants of copper (Cu) 0%, 3%, and 6%. Hardness test using the ASTM E92 standard Vickers method with a load of 10 Kg.f, tensile test using plate-shaped ASTM E8 standard specimens, and metallographic testing using an optical microscope magnification 50 times. The results of the hardness test showed variations in the addition of 3% copper (Cu) elements got the highest value is 109.37 HV, the lowest variation of 0% for an average of 79.2 HV and the value of hardness decreased by 6% which was an average of 93, 6 HV. The tensile test results at 0% copper have the highest tensile strength of 157 MPa and the lowest at the addition of 6% copper which is 127 MPa, then at 3% addition copper gets 118 MPa for the tensile strength. Observations from the metallography get the result that the more grain boundaries will increase material strength.*

**Keywords** : Aluminum, Mechanical Properties, Hardness Vickers Test, Tensile Strength Test, Metallography