

Pengaruh unsur Fe dan penambahan grain refiner Al-5TiB terhadap nilai fluiditas, mikrostruktur, morfologi fasa intermetalik, dan sifat mekanis pada paduan zamak 3 / Surya Irawan

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Abstrak

ABSTRAK

Pada industri hot chamber diecasting penggunaan scrap bekas gating dan proses machining penggunaannya tidak secara optimal untuk didaur ulang agar bisa menjadi raw material . Hal ini dikarenakan adanya unsur pengotor besi yang ikut terlarut kedalam paduan Zn-Al dan membentuk fasa intermetalik yang terlihat pada strukturmikro . Fenomena ini akan mengakibatkan terjadinya cacat dan penurunan sifat mekanis

Penelitian ini bertujuan mengetahui pengaruh penambahan modifier Al-5TiB sebagai grain refiner merubah morfologi fasa intermetalik sehingga meningkatkan fluiditas dan kekuatan mekanis dari paduan seng . Untuk mengetahui penyebab itu dilakukan penelitian dan pengujian meliputi pengecekan komposisi kimia, fluiditas , pengujian sifat mekanis , pengamatan struktur mikro dengan SEM & EDAX.

Dari hasil penelitian ini menunjukkan pengaruh dari pengotor melalui penambahaan kadar besi (Fe) 0.04% dan 0.19% yang dapat mengakibatkan peningkatan fraksi fasa intermetalik pada batas butir yang menyebabkan penurunan kekuatan tarik, impak dan fluiditas pada paduan Zamak 3.

Penambahaan grain refiner Al-5TiB dengan 0.5% dan 1% pada master alloy Zamak 3 dengan kandungan besi (Fe) 0.19% dapat membuktikan peningkatan sifat mekanis dan nilai fluiditas . Akibat terbentuknya fasa intermetalik yang terdistribusi seragam dibatas butir yang lebih halus dapat terlihat dari hasil pengamatan mikrostruktur.

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ABSTRACT

Zamak 3 is one of the many zinc aluminium alloys, as a raw material in the manufacturing industry with diverse product applications. This alloy has a good combination of mechanical properties, castability, and good dimensional stability. Therefore, the manufacturing is able to do with the method of die casting with the production on a mass scale and shape precision. In casting industry, scrap left over from casting results have not been optimal product use. This is because there is an element of excess impurities and reduce castability. Iron (Fe) element is the element contained impurities that reduce the ability of mechanical and fluidity.

As a result of these problems, the research carried out by utilizing the

composition and nature of the scrap is given modifier to reduce the negative influence of impurity elements are present. This study aims to determine the scrap optimization with the addition of grain refiner Al-5TiB. Through variation of the addition of 0.5% and 1%, this study will examine the intermetallic morphology phase of alloy structure, influence on the mechanical properties and fluidity with vacuum testing. Refined grains will reduce the influence of intermetallic that is because the element Fe.

The results showed that addition of Fe 0,04% and 0,19% (above standard 0,002%) can lead the increasing of intermetallic phases fraction at grain boundaries by microstructure analysis. Therefore, this intermetallic cause a decrease in mechanical properties and fluidity. The modification by added Al-5TiB to the alloy trigger the formation of a new phase with a subtle form intermetallic phase and prove an increase in the mechanical properties and fluidity. It is also a major effect on the value of the fluidity and mechanical properties of the alloy. Thus, we can conclude how much influence the grain refiner in distributing the intermetallic phase as seen in microstructure.