INTISARI

Proses pengelasan menggunakan jenis *Gas Metal Arc Welding* (GMAW) banyak dikembangkan agar produktivitas pengelasan meningkat. Jenis pengelasan yang digunakan salah satunya menggunakan las GMAW tandem (T-GMAW) tack weld. T-GMAW tack weld merupakan proses pengelasan gabungan yang menggunakan dua buah las GMAW yang menghasilkan satu *weld pool* yang sama dan penggunaan tack weld supaya material yang akan di las tidak berubah posisi. Tujuan penelitian ini untuk menyelidiki pengaruh jarak antar elektroda las terhadap distorsi dan sifat mekanis bahan AA 5083 H116 menggunakan las T-GMAW.

Penelitian ini menggunakan Aluminium AA 5083 H116 dengan tebal 3 mm dan pengelasan T-GMAW tack weld menggunakan variabel jarak antar elektroda sebesar 18 mm, 27 mm, dan 36 mm. Parameter pengelasan yang digunakan sama untuk kedua mesin las, yaitu jarak elektroda dengan spesimen = 10 mm, kecepatan las = 16 mm/s, tegangan las rata-rata = 19 V, arus las elektroda depan (I1) = 125 A, arus las elektroda belakang (I2) = 120 A, filler rate = 27 mm/s, filler diameter = 0,8 mm, Argon flow = 15 liter/menit. Pengujian yang dilakukan meliputi pengukuran distorsi, pengamatan struktur mikro, pengukuran nilai kekerasan Vickers, uji tarik, dan uji bending

Berdasarkan hasil pengujian pengelasan T-GMAW tack weld menunjukkan bahwa spesimen dengan. jarak antar elektroda sebesar 18 mm memiliki sifat fisis maupun mekanis yang paling baik. Hasil distorsi maksimum terkecil terjadi pada spesimen dengan jarak antar elektroda 18 mm sebesar 12,75 mm. Nilai kekerasan tertinggi ditunjukkan oleh spesimen dengan variasi jarak antar elektroda 18 mm dengan nilai VHN 80,75. Kekuatan tarik maksimum (*ultimate tensile strength*) dan nilai kekuatan bending yang paling besar dengan jarak antar elektroda 18 sebesar 262,11 MPa dan nilai kekuatan bending sebesar 492,41 Mpa pada bagian *face banding*.

Kata kunci: GMAW, T-GMAW, tack weld, AA 5083 H116, elektroda, distorsi, struktur mikro, uji kekerasan, uji tarik, uji *bending*.

ABSTRACT

The process of welding using Gas Metal Arc Welding (GMAW) has been developed so that the productivity of welding is increased. Types of welding used one of them use welding GMAW tandem (T-GMAW) tack weld. T-GMAW tack weld is a welding process combined the use of two welding GMAW process that produces a weld pool of the same and use of the tack weld so that the material will be in las not changed position. The purpose of this study is to investigate the influence of the distance between the welding electrodes against the distortion and mechanical properties of the material AA 5083 H116 welded T-GMAW.

This study uses Aluminum AA 5083 H116 with a thickness of 3 mm and welding of T-GMAW tack weld using distance between the electrodes 18 mm, 27 mm, and 36 mm. The welding conditions voltage, torch angle, welding speed, the flow rate of argon gas was made the same on both welding machine. After the welding process, the testing performed includes measuring the distortion, microstructure observation, the measurement value of the Vickers hardness, tensile test, and bending test

Based on the results of testing the welding of T-GMAW tack weld shows that the specimens with. the distance between the electrodes of 18 mm has the properties of the physical and mechanical. The farther the distance between the electrodes will then the longer the cooling rate that resulted in granules which are formed increasingly larger and the effect on hardness and tensile strength. The result of the distortion of the largest maximum occurs in the specimen with a distance between electrodes is 27 mm amounted to 14,225 mm. The highest hardness value was shown by specimens with the variation of the distance between the electrodes of 18 mm with the value of the VHN 80,75. Maximum tensile strength (ultimate tensile strength) and the value of the bending strength with the distance between the electrode 18 by 262,11 Mpa and the bending strength of 492,41 Mpa on the part of the face bending.

Keywords: GMAW, T-GMAW, tack weld, AA 5083 H116, electrodes, distortion, microstructure, hardness test, tensile test, bending test.