

Comparison of mechanical and microstructural characteristics in maraging 300 steel welded by three different processes: LASER, PLASMA and TIG

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Abstract

The maraging steel are considered ultra high strength due to its yield strength greater than 1400 MPa and are part of a set of advanced materials of interest for technological development, mainly for aeronautics and aerospace industry. For this purpose should submit good toughness, fatigue resistance and acceptable weldability. These steels are used in the aerospace industry as high-strength fasteners, engine casings and missiles, landing gear structures, among others.

There are few studies of the process of laser welding of this material, making it important to study the feasibility of welding these steels. A comparison between the traditional welding processes (TIG-Tungsten Inert Gas and PAW-Welding Plasma Arc) and the laser welding process (LBW - Laser Beam Welding) was performed.

To evaluate the mechanical properties were used tensile and hardness tests by microindentation, showing that the maraging steel can be welded with little loss in mechanical properties, with advantages for the laser welding process.

Microstructural characterization was performed by optic and scanning electron microscopy, showing that the fused and heat affected area in the process LBW is about 10 times lower than that affected by TIG and PAW process.