

OP 447

Compared to weld zone by Welding method to Cryogenic Austenitic Stainless Steel

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The International Maritime Organization (IMO) has implemented regulations since 2020 to strengthen the sulfur content of ship fuels from 3.5% to 0.5%. However, in use Liquefied Natural Gas (LNG) primarily consists of liquefied methane, which emits methane during production, transportation, and distribution processes. To significantly reduce greenhouse gases such as carbon monoxide, carbon dioxide, and methane, hydrogen energy is gaining attention as an alternative fuel. Compared with fossil fuels, hydrogen has sufficient economic viability in terms of production, transportation, storage, and versatility. Liquid hydrogen, in particular, has the advantage of significantly reducing volume by 1/800 compared to gaseous hydrogen, leading to about a 7 times increase in efficiency in storage and transportation, without the need for a separate dehydrogenation process. Therefore, it is a pivotal moment for the technological development of transportation methods that can utilize liquefied hydrogen in either gaseous or liquid states. In this study, GTAW (Gas Tungsten Arc Welding) and GMAW (Gas Metal Arc Welding) were performed using austenitic stainless steel. To compare the processes, differences in tensile strength and V-charpy impact strength values were analyzed used OM (Optical Microscopy) and EBSD (Electron Backscatter Diffraction) for understanding the causes of mechanical property differences.