

800 MPa급 무예열 용접재료의 폭파변형시험

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Explosion Bulge Test of 800 MPa Grade Pre-Heat Free Welding Consumables

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Abstracts

The Cu-bearing PFS-700 steel which has yield strength over 700 MPa was developed to replace the existing submarine structural material, HY-100. PFS-700 steel has good combination of mechanical properties and superior weldability which can be welded without pre-heating before welding. Application PFS-700 steel to submarine or battle ship will give a great reduction of cost by removing or lowering pre-heating. To develop pre-heat free welding consumables that matches and take advantage of PFS-700 steel, new welding consumables have been designed for the GMAW, SAW processes and explosion bulge test(EBT) were conducted to see the reliability of welded structure. All welding was conducted without pre-heating before welding, the inter-pass temperatures were below 50°C for SAW50 and 150°C for GMAW and SAW150. All EBT specimens show over 14% reduction of thickness without through-thickness crack or propagation of crack to the hole-down area. Tensile properties for all welding conditions show higher(GMAW) or similar values(SAW50, SAW150) to the base metal. Charpy impact values for the weld metal also show 163.5J(GMAW), 95.4J(SAW50) and 69.0J(SAW150), which meet the goal, 50J, of this project.

Key Words : Pre-heat Free Steel, PFS-700, Welding Consumables, Crack Start Test, Explosion Bulge Test