MECHANICAL PROPERTIES OF WELDED JOINTS OF LOW-ACTIVATION AUSTENITIC STEELS

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Abstract

The structure, mechanical properties and weld joints of low-activation austenitic Cr-Mn steels with 0.035, 0.1 and 0.25% carbon content were studied. Gas-tungsten-arc weld joints were made from Cr12Mn20W steels with the 0.04, 0.1 and 0.25 % carbon content and Ti (0,1%) and B (0,0045) additions. The effects of the temperature, long-time annealing and post-weld long-time annealing up to 5000 h under 400 and 600°C on mechanical properties and impact toughness of the base material, weld material and weld joints were studied. Mechanical properties of weld joints have a sufficiently high level although they are worse than that of basic material. Fracture of the weld joints mainly occurs through the basic metal. Post-weld long-time annealing practically does not decrease the mechanical properties of the weld joints regardless of carbon content. Annealing at 600°C/1000 h leads to brittleness of basic metal and welds for all steels. Microstructures of the base metal, weld metal and heat-affected zone are presented.

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