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Corrosion resistance of welded joints of X5CrNi18-10 stainless steel. Journal of materials Processing Technology, 2019, Vol: 266, Pages: 579

Scientific paper

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This paper considers the influence of nitrogen in the shielding gas during TIG welding as well as the influence of a welding current level on the resistance to pitting corrosion and intergranular corrosion in welded joints of X5CrNi18-10 stainless steel. Testing of pitting corrosion was carried out using the potentiodynamic method, while intergranular corrosion was tested with the Double-Loop Electrochemical Potentiokinetic Reactivation method.

Pitting corrosion resistance of welded joints (the weld metal and the heat affected zone) is higher in the presence of nitrogen in the shielding gas, while intergranular corrosion resistance remains unchanged. Pitting corrosion resistance of the heat affected zone in the welded joint formed in nitrogen-free shielding gas is lower than in the base metal, while the weld metal has similar pitting corrosion resistance as the base metal. With an increase in a welding current level, pitting corrosion resistance and resistance to intergranular corrosion of welded joints decrease.

The passivation current density is shown to be a good indicator of pitting corrosion resistance of welded joints. Hardness values of the weld metal and the heat affected zone are slightly lower than the base metal hardness value.

