

Strength properties of Al-Ti-Ni-Mo coatings obtained by supersonic plasma spraying

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Keywords: supersonic plasma dusting, adhesive, cohesive, aluminothermy.

Abstract

Conventional methods for producing powders for plasma spraying involve their production by fusing (compacting) the pure components and then spraying the resulting alloys or simply mechanically mixing the powders of pure metals. The results of the study of the cohesive and adhesive strength of coatings based on the Al-Ti-Ni-Mo alloy obtained on a steel substrate of the St-45 grade 100x15x1 mm using supersonic plasma spraying using air and its mixture with methane as a plasma-forming gas. The alloy was obtained by aluminothermic reduction of oxides in a resistance furnace, followed by grinding to a powder of 40-160 μm, which is necessary for application by this method. In the work, tests were carried out on a three-fold bend on the universal Zwick/Roell Z050 test machine, and hardness values were measured. The obtained results showed the absence of characteristic fractures, partial discontinuities were observed at the edges of the bend, and an analysis of the average values of the microhardness showed good strength properties. In this paper it was shown that the obtained coating based on Al-Ti-Ni-Mo is characterized by sufficiently high parameters of mechanical properties, and also withstands stresses in the region of elastic deformation. This coating, taking into account good anticorrosion properties, can be recommended for use in various fields of engineering. The work performed can serve as a basis for obtaining high-quality coatings in plasma deposition technology.

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