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EFFECTS OF HIGH-SPEED COOLING ON PHYSICAL AND MECHANICAL PROPERTIES OF AMG6 ALUMINUM ALLOY AFTER HIGH-TEMPERATURE HEATING

The effects of high-speed cooling on the physical and mechanical properties of the AMg6 aluminum alloy after high-temperature heating have been examined. An experimental procedure for improving the material viscosity in saving the strength characteristics due to a uniform dispersion distribution of the second phase in the grain has been developed. A preliminary heat treatment of the specimens has been conducted using four schemes: heating the specimen to 350 ºC into a furnace, water cooling to the indoor temperature; heating the specimen to 450 ºC in a furnace, water cooling to the indoor temperature; heating the specimen to 350 ºC in a furnace, cooling to -56ºC; heating the specimen to 450 ºC in a furnace, cooling to -56 ºC. High-speed cooling has been conducted in the solution of solid carbon dioxide in alcohol. Tension tests have been carried out using specimens of 50 and 100 mm length made from GOST 1497-84. Impact tests have been conducted using GOST 9454-78. According to the results of the tension experiments the yield point, the material ultimate strength and a relative extension of the specimen have been measured. In the impacts tests the impact strength coefficient and a specific work of failure have been measured. Experimental investigations demonstrated that all of the types of heat treatment reduce the yield point to 16- 20%, increase a specific work of failure to 23% and in practice do not change the yield point and a relative extension of the specimen. Better results on a specific work of failure have been obtained for the scheme of treatment when heating the specimen was performed to the temperature of 450 ºC followed by cooling to -56 ºC.

Keywords: *aluminum-magnesium alloy, heat treatment, high-speed cooling, yield point, ultimate strength, impact viscosity, specific work of failure.*

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