

The Influence of Heat Treatment on Mechanical and Corrosion Properties of Wrought Aluminium Alloys 2024 and 6064

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This article deals with the influence of the alloy temper during heat treatment on mechanical and corrosion properties of aluminium alloys 2024 (Al-Cu-Mg) and 6064 (Al-Mg-Si). For the experiment initial alloy tempers 2024-T351 and 6064-T8 were heat treated to three conditions – underaged, peak aged (T6) and overaged – to simulate the circumstances during the manufacturing process. Structure of all conditions and tempers was observed. The mechanical properties – hardness, yield strength, ultimate strength and elongation – and corrosion properties – maximum depth of corrosion attack penetration and corrosion rate in Audi immersion test for automotive industry (internal standard PV 11 13) – were measured. Structures of investigated alloy show evidence of intermediate phases arrangement in the direction of plastic deformation and they do not change during heat treatment. The lowest hardness, yield strength and ultimate strength have the underaged samples, the highest hardness, yield strength and ultimate strength have peak aged (2024) or initial samples (6064). Elongation decreases with ageing time or ageing temperature. In case of alloy 2024 corrosion rate and maximum depth of corrosion attack penetration increase with ageing time or temperature, in case of alloy 6064 corrosion rate increases with increasing ageing time or temperature while maximum depth of corrosion attack penetration decreases. Both alloys are attacked by intergranular corrosion with initiating surface pits.

Keywords: Aluminium alloys, heat treatment, precipitation hardening, corrosion and mechanical properties.

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