Influence of Pressure on Al-Si Alloys System

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The article deals with the calculation of temperature, the maximal solubility of the solid solution and determination of the eutectic temperature of the system Al-Si under the influence of elevated pressure. Monitoring effects of pressure on the equilibrium system Al-Si has an importance for the study of the crystallisation of aluminium alloys under pressure. Alloys based on aluminium and silicon, commonly referred as silumin, are the most important foundry aluminium alloys. First time binary alloys of this type were made by French chemist Sainte-Clair Devil more than 150 years ago. They showed low mechanical properties (Rm = 98 ÷ 117 MPa, A = 1 ÷ 3%). That changed in 1921 when the American A. Pacz discovered the effect of sodium on the crystallization of these alloys, that achieved thanks to this a significant increase in mechanical properties (Rm = 166 ÷ 225 MPa, A = 2 ÷ 8%). Recently, these alloys are processed by squeeze casting (crystallization under pressure). Casting alloys with high corrosion resistance, low coefficient of linear shrinkage, satisfactory mechanical and casting properties (excellent fluidity, low tendency to shrinkage during moulding), which moreover are good in welding and brazing [1, 2, 6, 8, 15, 18, 19, 20].

Keywords: Al-Si alloy, squeeze casting, pressure, freezing temperature

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