The effects of hot isostatic pressing on aluminium castings

Abstract:
Since the early 1960s hot isostatic pressing (HIP) was used to improve the quality of castings made of various alloys. The closure of pores, originating from the casting process, is considered as the main source of these improvements. For the aluminium alloy Al-9Si-3Cu specimens for tensile testing were machined from castings either squeeze casted and heat treated to T4 and T6 conditions or investment casted. The effect of HIP on density, roughness and mechanical properties was investigated. The density and roughness of the squeeze casted specimens did not change remarkably and their tensile strength became worse, because the initial heat-treatment-state was destroyed by HIP. The investment casted specimens became denser and roughness became worse due to closure of pores near the surface. Although roughness after HIP was higher than in the initial state, tensile strength was improved significantly by HIP, because of closure of the pores in the specimen.

Stichworte:
Al-9Si-3Cu; Aluminium castings; Hot isostatic pressing