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Title: Poisson's Ratio of Closed-Cell Aluminium Foams

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Abstract: A nondestructive impulse excitation technique was used to investigate Poisson's ratio of powder metallurgical pure closed-cell aluminium foams according to ASTM E 1876 within the foam density range of 0.430-1.390 gcm(-3). Instead of a constant value of 0.34, as according to Gibson and Ashby's assumption for the Poisson's ratio of metallic foams, the decrease of the Poisson's ratio with decreasing foam density was observed. Observed Poisson's ratio data were in the range of 0.21-0.34. To check the validity of the results, the Young's modulus was calculated using Poisson's ratio and its dependence on relative density was successfully modelled using the usual power law function with characteristic exponent of 1.72 +/- 0.1. This confirms that the obtained experimental results for Poisson's ratio are valid. Finally, rule of mixture and percolation theory were used to model the observed decrease of Poisson's ratio with increasing porosity.

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