

Material Selection Based on Application

Selection of materials for Efficient Small Springs

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By : M.F.Ashby

Materials for Efficient Small Springs

Material	$M_1 = \frac{\sigma_y^2}{E}$ (MJ/m ³)	Comment
Ceramics	(10 – 100)	Brittle in tension; good only in compression.
Spring steel	10	The traditional choice; easily formed and heat treated.
Ti alloys	10	Expensive, corrosion-resistant.
CFRP	8	Comparable in performance with steel; expensive.
GFRP	5	Almost as good as CFRP and much cheaper.
Glass	10	Brittle in torsion, but excellent if protected against damage; very low loss factor.
Nylon	3	The least good; but cheap and easily shaped, but high loss factor.
Rubber	20	Better than spring steel; but high loss factor.

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Created by : [Sankar Nellian](#)
For comments, send mail to grosse@ecs.umass.edu