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| Nota di contenuto       | Front cover; Polymer Foams Handbook; Copyright page; Contents;<br>Foreword; Acknowledgements; Chapter 1. Introduction to polymer foam<br>microstructure; 1.1 Open- and closed-cell foams; 1.2 Relative density:<br>wet and dry foams; 1.3 Edges; 1.4 Vertices; 1.5 Faces; 1.6 Cell<br>geometry; 1.7 Cells; 1.8 Foam microstructural models; 1.8.1 Lattice<br>micromechanics models; 1.8.2 Cell (bubble) growth; 1.8.3 Irregular<br>models; 1.9 Bead foams; References; Chapter 2. Polyurethane foams:<br>processing and microstructure; 2.1 Introduction; 2.2 PU chemistry; 2.3<br>PU foam processes; 2.3.1 Slabstock foam<br>2.3.2 Moulded PU foam2.3.3 Slow-recovery foams; 2.4 PU<br>microstructure; 2.5 Effect of microstructure on mechanical properties;<br>2.6 PU foam microstructure; 2.6.1 Slabstock PU foams; 2.6.2 Moulded<br>foams; 2.6.3 Rebonded PU foams; 2.6.4 Slow-recovery PU foams;<br>Summary; References; Chapter 3. Foamed thermoplastics:<br>microstructure and processing; 3.1 Introduction; 3.2 Polyolefins; 3.2.1<br>PEs and copolymers; 3.2.2 Blends; 3.2.3 Ethylene styrene<br>'interpolymers'; 3.2.4 Ethylene-propylene-diene monomer; 3.2.5<br>Polypropylenes; 3.3 Processing; 3.3.1 Extrusion of thermoplastic foam |

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|                    | <ul> <li>3.3.2 Melt rheology suitable for foaming3.3.3 Stages in closed-cell foam development; 3.3.4 Post-extrusion shrinkage; 3.3.5 Oriented PP foams - Strandfoam; 3.4 Foam crystallinity and crystal orientation; Summary; References; Chapter 4. Bead foam microstructure and processing; 4.1 Introduction; 4.2 Processing; 4.2.1 Bead preparation; 4.2.2 Steam moulding; 4.2.3 Dimensional stability post-moulding; 4.3 Microstructure; 4.3.1 Bead shape and fusion; 4.3.2 Density variations in large mouldings; 4.3.3 The effects of processing on properties; 4.3.4 Bead shape variation; 4.3.5 Microstructural models</li> <li>4.4 Specific bead foams4.4.1 PP bead foam: EPP; 4.4.2 PS bead foam: EPS; References; Chapter 5. Simple mechanical tests; 5.1 Introduction; 5.2 Stiffness and strength of structures; 5.3 Stress-strain responses and material parameters; 5.3.1 Linearly elastic and isotropic; 5.3.2 Elastically non-linear and isotropic; 5.3.3 Anisotropic and elastic; 5.3.4 Elastic-plastic; 5.3.5 Elastic-brittle; 5.3.6 Viscoelastic materials; 5.3.7 Viscoelastic phenomena; 5.3.8 Temperature-dependent properties; 5.4 Test types; 5.4.1 Uniaxial compressive tests; 5.4.2 Simple shear tests; 5.4.3 Bend tests</li> <li>5.4.4 Torsion tests5.5 Testing products with a density gradient; 5.5.1 Tensile or compression tests on EPS; 5.6.2 Tensile or shear impact; 5.6.3 Creep; 5.6.4 Compressive impact; 5.6.5 Poisson's ratio; 5.6.6 Humidity and temperature control; References; Chapter 6. Finite element modelling of foam deformation; 6.1.1 FEA packages; 6.1.2 Static vs. dynamic FEA; 6.1.3 FEA material models; 6.2 Elastic foams; 6.2.1 Curve fitting vs. strain energy functions; 6.2.2 Strain energy function for rubbers</li> <li>6.2.3 Ogden strain energy function for elastic foams</li> </ul> |
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| Sommario/riassunto | This handbook explores the applications of polymer foams, and the properties that make them suitable for so many applications, in the detail required by postgraduate students, researchers and the many industrial engineers and designers who work with polymer foam in industry. It covers the mechanical properties of foams and foam microstructure, processing of foams, mechanical testing and analysis (using Finite element analysis). In addition, it uniquely offers a broader perspective on the actual engineering of foams and foam based (or foam including) products by including nine detailed   |