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Nota di contenuto	Stirring; Contents; Preface; Symbols; 1 Stirring, general; 1.1 Stirring operations; 1.2 Mixing equipment; 1.2.1 Mixing tanks and their fittings; 1.2.2 Stirrer types and their operating characteristics; 1.2.3 Nozzles and spargers; 1.2.4 Sealing of stirrer shafts; 1.3 Mechanical stress; 1.3.1 Stress on baffles; 1.3.2 Stress on stirrer heads; 1.3.3 Tank vibrations; 1.3.4 Wear of stirrer heads; 1.3.5 Shear stress on the particulate material beinig mixed; 1.4 Flow and Turbulence; 1.4.1 Introduction; 1.4.2 Statistical theory of turbulence; 1.4.2.1 Description of turbulent flow 1.4.2.2 Energy spectra1.4.3 Experimental determination of the flow Conditions and their mathematical modeling; 1.4.3.1 Homogeneous material systems; 1.4.3.2 Heterogeneous material systems G/L; 1.4.3.3 Heterogeneous material systems L / L; 1.4.4 Pumping capacity of stirrers; 1.4.5 Surface motion; 1.4.5.1 Vortex formation. Definition of geometric parameters; 1.4.5.2 Gas entrainment via vortex; 1.4.6 Micro-mixing and reactions; 1.4.6.1 Introduction; 1.4.6.2 Theoretical prediction of micro-mixing; 1.4.6.3 Chemical reactions for determining micro-mixing 1.4.6.4 Experimental determination of micro-mixing1.5 Short introduction to rheology; 1.5.1 Newtonian liquids; 1.5.2 Non-

Newtonian liquids; 1.5.3 Dimensionless representation of material functions; 1.6 Short introduction to dimensional analysis and scale-up; 1.6.1 Introduction; 1.6.2 Dimensional analysis; 1.6.2.1 Fundamentals; 1.6.2.2 Dimensions and physical quantities; 1.6.2.3 Primary and secondary (Derived) quantities; dimensional constants; 1.6.2.4 Dimensional systems; 1.6.2.5 Dimensional homogeneity of a physical Content; 1.6.2.6 The pi-theorem
1.6.3 The Determination of a pi-Set by Matrix Calculation1.6.3.1 The Establishment of a Relevance List of the Problem; 1.6.3.2 Determination of the characteristic geometric parameter; 1.6.3.3 Constructing and solving of the dimensional matrix; 1.6.3.4 Determination of the process characteristics; 1.6.4 Fundamentals of the model theory and scale-up; 1.6.4.1 Model theory; 1.6.4.2 Model experiments and scale-up; 1.6.5 Remarks regarding the relevance list and experimental technique; 1.6.5.1 consideration of the acceleration due to gravity g; 1.6.5.2 Introduction of intermediate quantities
1.6.5.3 Dealing with material systems of unknown physical properties1. 6.5.4 Experimental methods for scale-up; 1.6.6 Conclusions; 1.6.6.1 Short Summary of the Essentials of the Dimensional Analysis and Scale-Up; 1.6.6.2 Area of applicability of dimensional analysis; 2 Stirrer power; 2.1 Stirrer power in a homogeneous liquid; 2.1.1 Newtonian liquids; 2.1.2 Non-Newtonian liquids; 2.2 Stirrer power in Gassed Liquids; 2.2.1 Newtonian liquids; 2.2.2 Non-Newtonian liquids; 2.3 Flooding point; 3 Homogenization; 3.1 Definition of macro- and micro-mixing; 3.2 Definition of degree of mixing
3.3 Determination of the degree of mixing and the mixing time

Sommario/riassunto

Stirring is one of the most important operations in process technology. No chemical exists that has non been submitted to a mixing process during its synthesis. Furthermore, stirring is important for the pharmaceutical and food industries, too.The most important mixing operations are applied to homogenize miscible liquids, to intensify the heat transfer between a liquid and the heat exchanger, and to perform mass transfer in multiphase systems, to whirl up solid particles in fluids and to disperse immiscible liquids.This book discusses in detail the above listed operations, tak