

19MSPS302 POLYMER ADDITIVES AND COMPOUNDING

Unit I: Introduction to Additives, Fillers & Reinforcements

Introduction to additives- Technological requirements, classification of additives, chemistry, function and mechanism, principles of mixing. Relevant Standards and specifications such as REACH. Fillers and reinforcements – mineral fillers – fibre reinforcements – glass fibre, carbon fibre, aramide fibre, natural fibres - Coupling agents.

Unit II: Processing And Anti Ageing Additives

Plasticizers and softeners, lubricants, Polymer processing aids. Anti ageing additives: Antioxidants, antiozonants, heat stabilizers, UV absorbers, light stabilizers. Flame retardants, coloring materials, blowing agents, cross-linking agents, toughening agents and impact modifiers. Principles of designing formulations for plastics products.

Unit III: Rubber Additives & Advanced Additives

Additives for Rubber : Manufacturing, properties and uses of carbon black- classification of carbon blacks- non-black fillers, plasticizers, accelerators, activators, cross linking agents, reclaimed rubber, factice and special purpose additives. Principles for designing formulations for rubber products.

Advanced Additives-Micro, Milli, Nano additives, special compounding techniques – Ultra sonication, Recent advances in additives, developments in compounding technology

Unit IV: Compounding And Mixing Techniques

Mixing and compounding techniques : Equipments : Batch mixers and continuous mixers, two roll mills, Internal mixers, ribbon blender, planetary mixer, single screw and multiple screw mixer, extruders. Principles and operating details of the above mentioned equipments.

Text Books:

1. Hand Book of Additives, Gatcher and Muller
2. Handbook of Rubber Technology : Steven Blow, Galgotia Publications
3. Rubber Technology, Maurice Morton, 3rd edition, Van Nostrand Reinhold Co., New York.

References:

1. Rubber Technology : Compounding & Testing for Performance : John.S.Dick, Hanser
2. Hand Book of Additives, Gatcher and Muller,
3. PVC Technology, Titow
4. Plastics Materials Ed. 7: Brydson J A, Butterworth Heinmann Publ.
5. Rubber Compounding : Principles, Materials and Techniques 2nd ed : Barlow , CBS