

# **AMPTE18 PLASTICS PROCESSING TECHNOLOGY-I**

## **UNIT-1 INTRODUCTION**

- 1.1 Basic principles of processing - shape and size
- 1.2 Effect of polymer property and processing
- 1.3 Newtonian and Non-Newtonian fluids - Rheology of polymer melts.

## **UNIT-2 COMPRESSION MOULDING & TRANSFER MOULDING 9**

- 2.1 Fundamental principles-Meaning of terms-Bulk factor and flow properties as applied to moulding materials
- 2.2 The methods adopted for estimating these properties and their limitations Process variables- Inter relation between flow properties-Curing time
- 2.3 Mould temperature and Pressure requirements-Preforms and preheating-Techniques of preheating-Machines used-Common moulding faults and their correction-Finishing of mouldings.
- 2.4 Fundamental principles of transfer moulding-advantages over compression moulding- Equipment used-Press capacity-Integral moulds and auxiliary ram moulds
- 2.5 Moulding cycles-Tool costs Moulding tolerances-Materials Theoretical calculation of pressures- Line pressures- Injection ram pressure-clamping
- 2.6 Heating requirements-Finishing of moulded parts- moulding faults- causes and remedies.

## **UNIT-3 INJECTION MOULDING**

- 3.1 Principles processing outline- Process variables- Mould cycle- Machinery used- Parts and functions- Specifications
- 3.2 Construction and maintenance - Start-up and shut down procedures - Cylinder nozzles
- 3.3 Press capacity projected area -Shot weight Basic theoretical concepts and their relationship to processing
- 3.4 Interaction of moulding process aspect effects in quoted variables
- 3.5 Introduction to trouble shooting.

## **UNIT-4 EXTRUSION**

- 4.1 Basic principles of extrusion- Types of extruders, general features of extruders viz. barrel, screw, types of screws, drive mechanism, specifications, heating & cooling systems, flow mechanism, die entry effects and exit instabilities.
- 4.2 Melt fracture & Bam- booning. Factors affecting the output of an extruder, process variables in extrusion processes and the downstream equipment's for the production of films, blown film, cast film/slot film, BO film, co extruded film.
- 4.3 Tube/pipe-sizing take off equipment, extrusion coating, wire & cable covering- pretreatment of conductor, cooling, takeoff equipment constructional features of dies for the above processes and trouble shooting.
- 4.4 Applications of extrusion and new developments.

## **UNIT-5 BLOW MOULDING**

- 5.1 Basic principles and definitions- Processor – viz, Injection Blow moulding, extrusion blow moulding, Accumulation blow moulding, Merits & Demerits
- 5.2 Development of blow moulding industry Processing Parameters-Temperature-Pressure and cycle time Components
- 5.3 Materials requirements related to process and product performance
- 5.4 Materials used-Limitations in product design presented by process characteristics
- 5.5 Design guide lines for optimum product performance and appearance
- 5.6 Equipment used- Hand and power operated equipment. Screw and Plunger Systems-Cross head and die design-Blow moulding machine features and operation including hydraulic and electrical control systems-faults, causes and remedies.
- 5.7 Parison programming, blow mould construction, cooling methods, mould venting, blow moulding of difficult articles like fuel tanks, odd shaped containers with handles, limitation in blow moulding, decoration of blow moulding products, hot stamping-multi colour printing-faults, causes and remedies.

**References Books:**

1. A Guide to Injection Molding of Plastics by Bolur, P.C. Development in Injection Molding By Whelan, A & Craft, J.L.
2. Technician's Hand Book & Plastics by Grandilli, P.A.
3. Plastics Materials & Processing By Schwartz & Goodman.
4. Injection Molding By Athalye, A.S.

