



INTRODUCTION TO SINGLE-SCREW AND TWIN-SCREW EXTRUDERS

Extrusion processes and the equipment to achieve these processes can become mind-bogglingly complex when you first learn about them. This book on Single- and Twin-Screw Extruders introduces the components and the mechanisms by which the components work together to make an extrusion process function. It has been broken up into sections that apply to both single- and twin-screw extrusion, single screw specific sections and finally sections solely on twin screw processes.

The text begins with basic information on how to perform Extrusion Troubleshooting followed by a discussion of the safety considerations that are important to extrusion processes and your involvement with them. These sections provide the foundation for the process overall.

Next we enter the realm of the single-screw extrusion process. Understanding the way things work is as important as understanding the mechanics. This section begins with a description of the process mechanism for single-screw extrusion. The insights in this section provide an understanding of why the process behaves as it does and gives a rationale for interpreting process performance and solving problems.

It is important to understand the equipment design and control instrumentation. And as the extruder is one part of the process, the upstream and downstream components are important and necessary components of a successful operation.

Since an extruder is not an isolated part of any process, the next focus is on upstream and downstream components that are intimately involved with the extruder. Also, since any process is designed to make product and that these products need to meet set specifications, the next section introduces quality control.

Quality is very important to any product and extrusion is no exception. It takes just as much work to make a quality product as it does to make a defective product. Producing product that is in specification and with low variability is important to ensure economic viability of your company and your job.

Basic operating procedures and extruder performance testing, as well as understanding resin properties, are critical to understanding daily operation and diagnosing problems.

Then maintenance is discussed. Maintenance is as important in a production facility as the actual production. Even more important, the safety of personnel and equipment frequently depends on how well the machines are maintained.

The twin-screw section begins with safety and is geared to the unique characteristics of twin-screw extrusion. Then co-rotating versus counter-rotating and intermeshing versus non-intermeshing twin-screw

designs are described. Also the basic design, operation, control, and materials of construction for twin-screw extruders are presented along with typical startup, steady-state operation, and shutdown procedures.

As twin-screw systems have a different anatomy, they also require a different way to characterize their performance. The reference points from which one can compare future behavior and diagnose equipment problems are explained.

Then this book ends with a reflection on safety, which should be a part of everything we do.

