

Engineering Principles of Plasticating Extrusion

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by Z Tadmor and I Klein (1970)

This is obviously an older text but is still unmatched in its balance of clarity and depth. The assumptions used in the models are well described and in systematic fashion these assumptions are relaxed and more complex descriptions are derived. It was written during the most intense period of research into the dynamics of single screw extrusion and, while there is more current literature that should be read, this book provides a cornerstone for that work. Much of the early work is well referenced and subsequent contributions to the literature are modifications of the models developed in this text.

The first three chapters provide an introduction to extrusion, fluid flow and the channel geometry to be used throughout the book. Chapters 4-6 proceed step by step through the unit operations of extrusion: solids conveying, melting, and melt conveying. Chapter 8 discusses modeling and is out of date. Chapter 10 outlines considerations of temperature and pressure measurement and chapters 9 and 11 discuss measured fluctuations and their interpretation in terms of process stability.

As someone involved in the design and macroscopic modeling of extruder screws (relate T, Q, N, P) I have found this book a handy and well used reference.

- Dr. Kenneth Powell, Becton Dickinson Research Center