

Extrusion Dies for Plastics and Rubber

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by Walter Michaeli 2nd Revised Edition Hanser Publishers, Munich, 1991

This is a basic text that intends to broadly cover the area of die design. As for most polymer engineering texts, it begins with a chapter on the description of polymer properties, followed by one on the isothermal flow in basic channels. Some methods for calculating the more subtle slip stick flow are briefly discussed. Computations for the more realistic flows with temperature distribution are then presented in their own chapter. As with most texts on melt flow, a discussion of the three dimensional formulation of the conservation laws is presented. Methods for solving them as finite difference or finite element are then described with some examples. The chapter concludes with a brief description of extrudate swell.

Applications are then the mainstay of the text. The next three chapters cover monoextrusion dies, coextrusion dies, and dies for elastomers. Basic dies, such as coat hanger, mandrel, and wide slit dies, as well as some specialty dies, e.g., dies for the production of nets, are discussed. Some design strategy is discussed for each of the types of dies. Emphasis is on the fluid mechanics of each of the die types, but a brief discussion of die mechanical integrity is offered, too.

Operational principles of die heating, handling, and calibration are featured in the last chapters. A short chapter on mechanical design is included in this section, which is an often neglected topic in many texts and articles on dies.

The book contains abundant references for more details on the many topics that are covered. Its intention to broadly cover design is well met, and the references provide means for obtaining the details of aspects of die technology.

- S. Derezinski Eastman Kodak Co.

The rubber extrusion process involves pushing unvulcanized rubber compounds through an extrusion die under pressure. Learn more about how extruded rubber products are made. Extruded rubber products differ from molded rubber products based on how they're made. Extruded parts are forced through a die of the required cross section under pressure of an extruder. These parts are often made with soft, unvulcanized rubber compounds that are fed into the extruder. The resulting extrusion leaves the rubber in a soft, pliable state. In this case, the finished extruded products will typically need to be vulcanized, or hardened, before they are rendered usable. How Does Rubber Extrusion Work? The extrusion is then cooled and forms a solid shape. The shape of the die determines the shape of the tube. The animation below shows a close up of the steel die. The hole in its centre is a hexagon. This means that the fluid plastic forms a hexagonal section when it is forced through the hole. Dies can be manufactured to almost any section / shape, including tubes. Below are examples of the type of shapes (sections) that can be extruded using an extrusion machine. [Click here for equipment and processes index.](#)