

Preface

This primer is specific to synthetic thermoplastic foams and to foams that are extruded. Foams offer unique advantages over traditional materials and unfoamed materials. They have unique insulating properties, impact-resistant properties, buoyancy, and outstanding strength-to-weight ratios, among other attributes. Foam processing and product performance strongly depend on the material and processing characteristics of the unfoamed thermoplastic polymer.

Foams also pose unique processing challenges. Thermoplastic foams are the result of deliberately adding at least one foamable substance such as a chemical foaming agent, a soluble gas, or a volatile liquid to the polymer in a pressurized melt or semi-solid state. The pressurized gas-laden melt is then depressurized to induce the foamable substance to yield gas in discrete bubbles. The technical challenge lies in controlling bubble nucleation and growth in an extrusion process to produce quality foamed sheet or profile.

In 1996, I self-published *Thermoplastic Foams*, a 700-page compendium of the technical aspects of thermoplastic foam production. Although extruded foam production is included, the work also includes injection molded, blow molded, and rotationally molded foam production. That book will go out of print shortly.

While the price of the book was modest, its technical focus and length were off-putting to many people. When Hanser initiated its *Understanding* series, it seemed appropriate that the interests of non-technical people could best be addressed in a book that presented general concepts without extensive theory or equations. The thermoplastic foam market is significant and the products are ubiquitous. This monograph is an introduction into a major segment of that market, namely extruded thermoplastic foam. There are only a few illustrative equations. General references are found at the end of the text but are not cited in the text. A glossary of common terms is also found at the end of the text.

As with many of my other books, this book was written “between jobs.” I thank Christine Strohm, Editor, Hanser Gardner, for believing in the marketability of my writing and for squeezing the manuscript into Hanser’s publishing schedule, without a formal contract in place. This book is dedicated to my wife, Jean, who has, as always, provided me with the love, support, and understanding I needed to complete this task.

James L. Throne, PhD
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