



Where To Start

Every day we are partners in seal design and troubleshooting with engineers in industries as diverse as automotive, computer, and medical devices. This experience has taught us that most successful seal designs are the result of what we call “Seal Thinking™”, the careful application of sealing concepts that are basic, but not obvious or intuitive.

The new Apple Rubber Seal Design Guide makes “Seal Thinking™” even more accessible. New features such as “Rules of Thumb” are the product of hundreds of conversations with engineers about what must be emphasized to achieve a successful design. We have been very fortunate in the many opportunities we have had to work with dedicated and gifted engineers. In a very real sense, they are contributors as well.

The O-Ring Example

Throughout this guide, the O-ring is used as an example in our discussion of seal design principles. We have made this choice for these reasons:

1. It is the most common and most widely known type of seal in use today.
2. It is used in all types of applications and by a broad range of industries.
3. In most new designs, the O-ring is the FIRST type of seal to be considered.

Also, as a practical matter, a discussion of the many types of seals would overwhelm our primary purpose, which is to illustrate the general principles of seal design.

Rules of Thumb Put Information at Your Fingertips

This new edition includes Apple Rubber’s Rules of Thumb: basic information anyone working with seals should know and understand. We think you’ll find that a small investment of your time in reading these rules will yield a greater understanding and knowledge of sealing principles. These rules are distributed throughout the book and summarized in Section 11.

The Visual Seal Glossary

One of the most exciting new features of Apple Rubber’s new edition is a Visual Seal Glossary, notable for color illustrations that let you see an array of sealing products at a glance. It can help you connect the proper terminology with a variety of sealing devices and related components, which may even spark an idea for your application. The Visual Seal Glossary is included in Section 11.

How This Book Works

Apple Rubber’s new edition is organized into 12 sections. You can start wherever you like, but we recommend you at least go over the Rules of Thumb.

In this guide you will find information on basic concepts of O-ring design, seal types and gland design, critical operating environmental factors, a material selection guide, troubleshooting, ordering procedures, O-ring size charts, and much more. Our goal is to offer you the most comprehensive guide in the seal industry today.

Beyond These Pages

As noted, there are so many types and variations of seals that it is impossible to cover them all in this book. Also, space limitations made it difficult to fully address a number of our many capabilities such as Liquid Injection Molding (LIM), composite seals, custom engineering, and complete quality assurance. If you don’t see what you need here, don’t hesitate to contact Apple Rubber. Here’s how:

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For more information, including our complete list of available products and literature, visit us online.

Acknowledgments

As a leading designer and manufacturer of seals and sealing devices, Apple Rubber is in a unique position to bring you this new edition. The information presented comes from our extensive experience with sealing products since our founding in 1971, as well as the most up-to-date sealing industry sources such as:

- Elastomeric material suppliers
- Technical societies and associations
- Technical books, magazines and journals

You'll find a list of these source materials and organizations in the bibliography at the back of this book.

We also wish to extend sincere appreciation to everyone associated with Apple Rubber who made this book possible – our experienced engineers, our technical and manufacturing personnel, our quality control people, our customer service staff, and most importantly, customers like you whose needs for better sealing solutions drive what we do.

Specifically, thanks go out to our editorial staff, including:

Mary K. Chaffee, Senior Editor
 Thomas J. Hammer, Associate Editor
 Kevin Oberholzer, Associate Editor

Feedback, Please

Apple Rubber created our first Seal Design Guide and this new edition in great part by listening to our customers. We welcome your comments and suggestions on this edition so that future issues meet your changing needs.

To give us your feedback, contact Mary Chaffee, Marketing Director, at:

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Please Note the Following:

The applications, suggestions and recommendations contained in this book are meant to be used as a professional guide only. Because no two situations or installations are the same, these comments, suggestions, and recommendations are necessarily general AND SHOULD NOT BE RELIED UPON BY ANY PURCHASER WITHOUT INDEPENDENT VERIFICATION BASED ON THE PARTICULAR INSTALLATION OR USE. We strongly recommend that the seal you select be rigorously tested in the actual application prior to production use.

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