



MacrOring[®] Seals

The Strongest O-Rings for
Large Applications

 Apple Rubber

applerubber.com

Tougher O-Rings With Tighter Tolerance

When it comes to producing large o-rings for today's demanding applications, outdated slash and glue seals just won't cut it. In response to growing market demands for stronger, larger o-rings, Apple Rubber developed MacOring® seals as an optimal choice with tighter tolerances.

The Superior Sealing Choice

MacOring® seals are the product of Thermobonding – Apple Rubber's breakthrough manufacturing process for large o-rings and seals. This unique bonding process molds the joint with proprietary adhesives and cures to produce a well-blended joint with little to no mismatch and excellent flexibility.

A 45° scive is used on a cross section of .375 or lower. For cross sections greater than .375 or when the material choice is silicone, a butt cut should be used.

When to Consider MacOring® Seals

MacOring® seals should be applied when a static application requires a seal from 2" I.D. to 500" I.D. and beyond in small or large production runs. If fast turnaround time is required, Apple Rubber will ship MacOring® orders within 24 hours.

Whether you currently use molded large o-rings, seals produced by conventional bonding methods, or are undecided as to which seal is best for your application, Apple Rubber's MacOring® seals are the economical, superior choice.

NOTE: MacOring® seals are a cost-effective solution for a wide variety of static applications, including seals for high-pressure tanks, lid seals and face seals.

For example, Apple Rubber was able to replace fully molded silicone seals in a liquid storage tank with MacOring® seals, which resulted in lower costs. In another case, a customer was able to purchase higher quality seals developed with Thermobonding for the same price as seals produced by conventional methods. To help make your own comparison, Apple Rubber can provide prototypes and samples to test your application.

The Quality You Count On

Superior quality is inherent in Apple Rubber's Thermobonding process. While conforming to all ISO

9001 and AS9100 guidelines, strict process control at every step assures quality parts with the following inspections:

- » **Cord Inspection:** We perform full acceptance testing on all cord before it is used. All cord is sampled for durometer, density, tensile, elongation and cross sectional measurement. All certificates of conformance are ensured to meet the required specification of customer applications
- » **Complete Part Inspection:** Quality assurance testing is completed after the o-ring is produced. Inner diameters are measured with fully calibrated measuring equipment
- » **Complete Quality Documentation:** For high-quality requirements, Apple Rubber can provide all the quality documentation you need, including Statistical Analysis, FMEA, PAPP, Control Plans and compliance to ASTM D2527

NOTE: Tensile strength testing is also available if necessary.

Available Materials

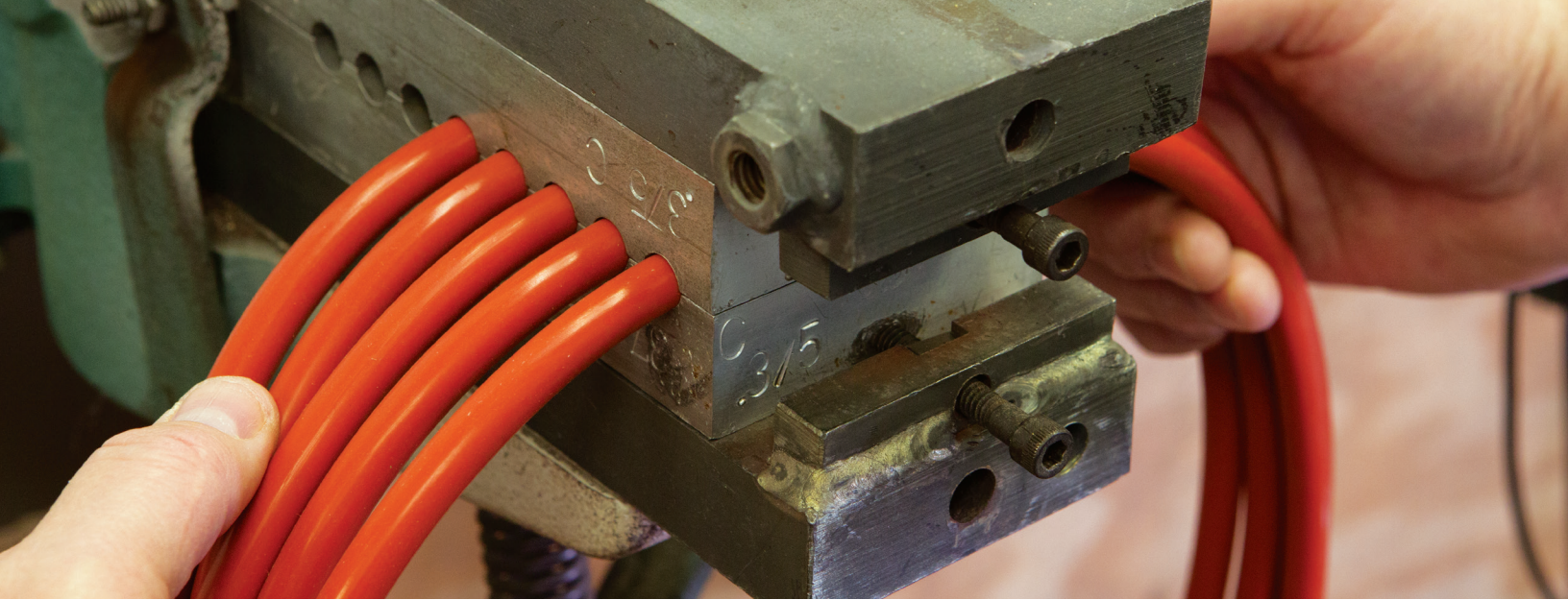
Apple Rubber has the most popular rubber materials available on-hand for fast production. Available materials include:

Material*	ASTM D2000	Durometer
Silicone	FC, FE	40-70
Nitrile	BF, BG, CH	40-70
Neoprene	BC, BE	40-70
Fluorosilicone	FK	50-80
Fluorocarbon	HK	75-90
Neoprene Sponge		low to medium density

**Special materials not listed here are available upon request.*

Apple Rubber can also apply Thermobonding to medium density, closed-cell sponge cord. Our sponge cord is available in neoprene. The thermobonding process ensures a flexible, not rigid joint.

Typically, sponge is used for dust and waterproofing applications including cases, product displays and other sealed, static environments.



Other Services Offered by Apple Rubber

As a leading designer and manufacturer of seals and sealing devices, Apple Rubber has a broad range of capabilities to meet your sealing requirements. These include:

- » Cord stock in precision cut lengths, both scive and butt cut
- » Expert one-on-one design engineering assistance
- » Custom in-house prototyping

MacOring® Sizes

MacOring® seals are available from 2" I.D. to 500" I.D. and beyond, as well as cross sections ranging from .070" to 1". Apple Rubber can custom engineer MacOring® seals to meet your specifications, and prototypes or samples can be generated within 24 hours.

I.D. Range (in.)	Tolerance (in.)
2.00 to 3.08	+/- .025
3.09 to 3.99	+/- .031
4.00 to 5.99	+/- .039
6.00 to 7.99	+/- .050
8.00 to 10.99	+/- .063
11.00 to 16.99	+/- .079
17.00 to 21.99	+/- .100
22.00 to 26.99	+/- .125
27.00 to 28.99	+/- .140
29.00 & over	to find the dimensional tolerance multiply by 0.6%

This quick reference guide is designed to provide dimensional inspection criteria for Thermobonded o-rings for which no customer requirements have been specified.

Cross Section Tolerances

Actual Cross Section	Tolerance (in.)	Actual Cross Section	Tolerance (in.)
.070	+/- .007	.275	+/- .010
.093	+/- .007	.313	+/- .012
.103	+/- .007	.375	+/- .012
.125	+/- .007	.437	+/- .016
.139	+/- .007	.500	+/- .016
.188	+/- .010	.625	+/- .020
.210	+/- .010	.750	+/- .030
.250	+/- .010	1.000	+/- .040

Apple Rubber can provide complete quality assurance documentation for MacOring® seals, including dimensional and material validation to your specifications.



One Source for All Your Sealing Needs

Apple Rubber stocks AS568 and ISO 3601 standard sizes, most common metric sizes, plus a wide variety of non-standard o-ring sizes. Our materials meet mil-spec, medical and automotive specifications.

Apple Rubber offers expert custom molding for non-standard rubber products. With in-house tooling, we save more time and resources compared to offshore operations. We offer expertise at any level of production, from prototype to high volume tooling.

When you call Apple Rubber, you deal directly with the manufacturer. Our experienced staff provides complete and comprehensive service to help you get the correct product for your application.

Full Line of Quality Apple Rubber Products

Products:

O-Rings — standards, metrics, MicrOrings®, MacOrings®

LSR (Liquid Silicone Rubber)

Composite seals (rubber bonded to plastic or metal)

Custom-molded seals and shapes

Medical seals

Thermobonded seals

FilterSeal™

Military specs

Standard and exotic materials

Services:

Design capabilities

Prototyping and production runs

Full quality-control laboratory

Class 10,000 (7) Cleanroom

ISO 9001 / AS 9100 Certifications

ITAR Registered



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