Rubber Molding Capabilities
Molded Components | Masking Solutions | Product Protection
For more than 70 years, Caplugs has been a leader in plastic and rubber molding. We are committed to providing our customers with the highest quality products from a trusted partner.

Caplugs has the infrastructure, global footprint, molding capabilities, engineering resources, quality certifications and certified processes to meet your needs, with local sales experts around the globe. The Caplugs team will collaborate with you every step of the way to develop a solution that fits your exact requirements.

With six different manufacturing processes, we are built to meet the needs of customers across a variety of industries. This range of capabilities ensures we can solve your challenge today, as well as your future challenges, helping you minimize your supplier base. Caplugs will deliver your components on-time, and on budget.

Quality Certifications
Caplugs has a comprehensive ISO certified quality management system and the latest testing and measurement technologies to provide consistent quality.

Technical Support
Sales people are spread across the globe ensuring personalized service. Our inside team of sales engineers and dedicated customer service representatives are available to help you every step of the way, from design and prototyping to delivery.

In-House Engineering
A team of in-house design engineers will consult one-on-one with you to design and develop a part to meet your needs.

Global Manufacturer
Caplugs is headquartered in the U.S. with manufacturing facilities throughout North America, Europe, China and Australia. With our global footprint, we can seamlessly service customers domestically and internationally.

“Caplugs is your trusted supplier for molded components, masking solutions and product protection.”

Over 450,000,000 parts in stock.
15,000,000+ parts produced per day.
Over 40,000+ standard parts.
Over 300 molding machines.
Over 15 design engineers.
10 global manufacturing facilities.
The 1 partner you need.
why choose Caplugs for your rubber molding needs?

Our rubber molding facility is located in Hangzhou, China. It is wholly owned by Caplugs and governed by our ISO certified quality management system.

Our rubber tooling is developed in-house using durable P20 steel, ensuring the highest quality and longest tool life.

Rubber Molding Processes

- **Compression Molding**
  We have more than 70 presses ranging from 100 to 1,200 tons. With compression molding, most prototypes are available in 15 days.

- **Transfer Molding**
  A similar process to compression, but enables more complex geometries.

- **Injection Molding**
  Ideal for more complex geometries and tighter tolerances.

How Caplugs Supports Your Rubber Molding Project Needs

1. Engineering Team for Part Design
2. Project Management & Technical Sales Support
3. Dedicated Service Team
4. In-House Compounding for Customized Performance-Enhancing Material
5. Full Material Control from Batch to Batch
6. ASTM Standards & Lab Testing
7. Global Manufacturing & Warehousing Facilities

full process control – 100% in-house

Compound Mixing and Development

All materials for rubber molded components are formulated and mixed in-house by our team of expert chemists to ensure performance and consistency. We have in-house mixing capabilities for both organic and silicone materials, including EPDM, NR, NBR, SBR, HNBR, CR, IR and FKM. To ensure components can stand up to the elements, material additives such as heat or UV resistance can be easily compounded into your rubber molded parts.

Our in-house chemists know rubber molding inside and out. They inspect and perform analysis, compound testing, performance simulation and processability/repeatability testing on each batch of rubber material, so you can be confident that the performance of your rubber molded components will meet all required specifications.

Custom Compound Options

- Custom coloring for branding
- Self-lubricated NR and CR for assembly issues
- UL94 5VA flame resistant EPDM and CR
- Wear resistant SBR
- FDA and medical grade silicone
- High temperature resistant silicone with dielectric strength properties
- FDA grade EPDM

Quality Management Systems

Caplugs’ stringent quality management systems are designed to meet customer expectations and manufacturing regulations. Our Production Part Approval Process (PPAP) is a critical component of our comprehensive quality management systems. PPAP provides traceability, record retention and strict process controls to ensure specifications are met.

Our quality systems in the New York and Pennsylvania facilities are certified to ISO 9001 & IATF 16949. Our quality systems in our California and Texas facilities are certified to ISO 9001. Our quality systems in Shanghai and Hangzhou, China, are certified to ISO 9001 & IATF 16949. Our New York and Shanghai facilities are also qualified as suppliers to all Cleanroom medical products. Our environmental systems in the New York, Pennsylvania and California facilities are also certified ISO 13485.
Caplugs has streamlined the custom process to make it efficient and economical. Our project team will lead you through the 5-step process to quickly take you from part concept to full production and delivery.

1 > Discovery Process
A dedicated engineer will work with you one-on-one to identify and understand the application, environment and process challenges.

2 > Concept/Design
Your engineer will design a part to meet your specifications and recommend the best material for your environment. The team will review part installation, functionality, lead time and price point to ensure we meet all project requirements.

3 > Economical Prototype Molds
Our engineers can provide a SolidWorks rendering or 3-D prototype in as little as 2 to 3 weeks.

4 > In-House Manufacturing
All manufacturing is done in-house and controlled by our engineers and production team, ensuring quality parts and efficient timelines.

5 > Specialized Processes & Services
- Secondary Operations
- Cryogenic Deflashing
- Internal Testing Labs
- ASTM Standards Testing
- Assembly
- Special Packaging

**Application Specific**
Designed for your specific application, ensuring all size and tolerance requirements are met.

**Designed for Performance**
Part developed for your environment, eliminating risk of part failure.

**Added Value**
Customization of material can actually add value to the part and your application, such as sound dampening.

**Exact Fit**
Ensures easy installation and secure fit of part.

**Material Performance**
Doing our own compounding enables us to add key performance features to our parts like heat resistance, UV/ozone resistance, vibration and sound dampening, chemical/fuel/oil resistance and more.

**Cost Effectiveness**
Retrofitted components not designed for your application will cost you more time and risk than a custom solution.

**Short Lead Times**
Our custom process is streamlined for lead times in just weeks, not months.
expertise and experience across a wide range of industries

Serving as the leader in product protection for over 70 years, Caplugs innovative products and extensive custom capabilities are designed to solve challenges across most industries - from leading automotive suppliers to medical device manufacturers. With comprehensive manufacturing capabilities, a wide range of material options and rigorous process control, we are a dedicated partner, providing you the solutions and service you need.

General Manufacturing
Automotive
Medical
Masking
Energy/Oil & Gas
Hydraulics
Electronics
Packaging
HVAC
Fabrication
Consumer

solutions for every industry

Rubber Bumper
Industry: Automotive
Application: Lift Gate Bumper
Volume: 1,000,000 pieces
Material: EPDM

Large Conduit Plug
Industry: HVAC
Application: Protective Plug for Industrial AC Unit to Secure Against Foreign Objects and Debris
Volume: 500,000 pieces
Material: EPDM

2” Diaphragm
Industry: Water Systems
Application: Commercial Plumbing Vacuum System
Volume: 10,000 pieces
Material: Butyl

Rubber Ball
Industry: Metal Separation Equipment
Application: Rubber Balls Used in Screen Application
Volume: 100,000 pieces
Material: FDA EPDM and Silicone
**Wiring Connector Cover**
- **Industry**: Heavy Equipment/Industrial
- **Application**: Cover for Wiring on Connectors on Diesel Engines for Heavy Machinery
- **Volume**: 25,000 pieces
- **Material**: HNBR

**Motor Mount Plug**
- **Industry**: Automotive
- **Application**: Rubber Diverter for Engine Mount
- **Volume**: 1,000,000 pieces
- **Material**: High-density NR

**Vibration Dampener**
- **Industry**: HVAC
- **Application**: Dampener for Sound and Vibration
- **Volume**: 750,000 pieces
- **Material**: EPDM/Nitrile

**Roofing Cap for Stand Pipes**
- **Industry**: Roofing
- **Application**: Sealing Stand Pipes
- **Volume**: 25,000 pieces
- **Material**: Silicone/EPDM

**Protective Plug**
- **Industry**: Automotive
- **Application**: Plug for Truck Bed Liner
- **Volume**: 1,000,000 pieces
- **Material**: Extreme UV EPDM

**Sheet Metal Body Plug**
- **Industry**: Automotive
- **Application**: Body Plug to Seal Out Water and Environment
- **Volume**: 1,000,000 pieces
- **Material**: EPDM

**Silicone Cap**
- **Industry**: Medical
- **Application**: Protects Delicate Instrument Ends during Shipping and Storage
- **Volume**: 30,000 pieces
- **Material**: Silicone

**Clamp**
- **Industry**: Industrial
- **Application**: Cushions for Hose Clamp to Absorb Vibration and Noise Damping
- **Volume**: 500,000 pieces
- **Material**: EPDM, Silicone and Neoprene
Build Your Custom Rubber Part

To begin development of your custom rubber solutions, we need to start with the specifications.

1. Material Review & Selection
2. Dimensional Tolerance Review

Important Notices

All statements, technical information and recommendations related to Caplugs products are based on information believed to be reliable, however, the accuracy or completeness is not guaranteed. Before using any Caplugs product you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in Caplugs current publications, or any contrary statements contained on your purchase order, shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of Caplugs. Also, Caplugs currently has no processes or procedures in place to meet the California Transparency in Supply Chains Act of 2010.
Drawing Designation “A2” Precision
Drawing Designation “A2” tolerances indicate a precision product. Molds must be precision machined and kept in good repair. While measurement methods may be simpler than with Drawing Designation “A1,” careful inspection will usually be required.

<table>
<thead>
<tr>
<th>Size Above (Inches) Incl.</th>
<th>Fixed</th>
<th>Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>± .004</td>
<td>± .005</td>
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<tr>
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<td>± .005</td>
<td>± .006</td>
</tr>
<tr>
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<td>± .008</td>
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<td>± .016</td>
</tr>
<tr>
<td>4.00</td>
<td>± .016</td>
<td>± .020</td>
</tr>
</tbody>
</table>

6.30 and over – To find fixed dimensional tolerances, multiply by 0.4%.

Drawing Designation “A3” COMMERCIAL
Drawing Designation “A3” tolerances indicate a “commercial” product and will normally be used for most products.

<table>
<thead>
<tr>
<th>Size Above (Inches) Incl.</th>
<th>Fixed</th>
<th>Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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</tr>
<tr>
<td>4.00</td>
<td>± .025</td>
<td>± .032</td>
</tr>
</tbody>
</table>

6.30 and over – To find fixed dimensional tolerances, multiply by 0.4%.

Dimension Terminology

The following will provide a common terminology for use in discussing dimensions of molded rubber products, and for distinguishing various tolerance groupings.

Fixed Dimensions
(Dimensions not affected by flash thickness variation.) Definition – Parallel to mold parting line or the parting lines of major mold sections. In the case of a simple wheel, with half the wheel formed in each half of the mold and the flash line around the O.D., the G.D. and the hub diameter are fixed dimensions. Holes formed by solid pins will usually be included in the classification.

Closure Dimensions
(Dimensions affected by flash thickness variation.) Definition – Vertical to the mold parting line or to parting lines of major mold sections. In addition to the shrinkage, mold maker’s tolerance, trim and finish, a number of other factors affect closure dimensions. Among these are flow characteristics of the raw stock, weight and shape of stock, types of flash grooves or other relief devices. These conditions all affect the degree of mold closure.

While closure dimensions are affected by flash thickness variation, they are not necessarily related to basic flash thickness. If a manufacturer plans to machine or die trim a product, the mold will be planned with an artificial flash, which would be thicker than if hand deflashing or tumble trim were to be employed. Thus products purchased from two sources could have a different basic flash thickness at the parting line and yet meet the drawing dimensions. There is usually a logical place for the mold designer to locate the parting line for best dimensional control. If the product design limits this location, an alternate mold construction will be required, which may affect the tolerance control on the product, and may, in some cases, increase the cost of the mold.

When applying tolerances, the following rules should be kept in mind:

1. Fixed dimension tolerances apply individually to each fixed dimension by its own size.
2. Closure dimension tolerances are determined by the largest closure dimension and this single tolerance is used for all other closure dimensions.
3. Fixed and closure dimensions for a given table do not necessarily go together and can be split between tables.
4. Tolerances not shown will be determined upon consultation with the rubber manufacturer.
5. Care should be taken in applying standard tolerances to products having wide sectional variations.
understanding dimensional tolerances for rubber components

Unlike rigid machined materials, thermoset molded elastomers do not lend themselves to the same level of tolerancing. Being thermally molded, elastomers are subject to many variables. Temperature, cure time, mold tolerance, mold registration, compound variation and shrinkage are just some factors all molders encounter. The Rubber Manufacturers Association (RMA) has developed tolerance tables with ranges to provide communications between users and providers across a wide range of industries, from precision aerospace electronic components to open tolerance products for consumer goods. These tolerance designations relate to the variability inherent in processing molded rubber parts, and are referred to as RMA A2 “Precision” and RMA A3 “Commercial” dimensional tolerance designations. There are obviously costs involved as the rubber molder prepares to meet customer requirements at the RMA A2 level. This includes preparations for tooling, extra features, cavity finishes and cavity flow provisions. In processing, very close temperature control and timing of molding cycles may also add to the cost of the part.

The type of rubber material and particularly its durometer hardness will determine if the part will experience substantial size change during its cool down.

"A2" Precision Drawing Designation

Dimensional Tolerance Table for Molded Rubber Products

<table>
<thead>
<tr>
<th>Size (Millimeters)</th>
<th>Fixed Closure</th>
<th>Fixed Closure</th>
<th>Fixed Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>40</td>
<td>0.40</td>
<td>0.50</td>
<td>1.60</td>
</tr>
<tr>
<td>50</td>
<td>0.50</td>
<td>0.63</td>
<td>2.50</td>
</tr>
<tr>
<td>63</td>
<td>0.63</td>
<td>1.00</td>
<td>4.00</td>
</tr>
<tr>
<td>80</td>
<td>0.80</td>
<td>1.60</td>
<td>6.30</td>
</tr>
<tr>
<td>100</td>
<td>1.00</td>
<td>2.50</td>
<td>10.00</td>
</tr>
</tbody>
</table>

Multiply by .004 .005

Above Included Above Included

Soft parts are best inspected on an optical comparator versus calipers or gauges.

Thin wall parts may be checked on a template or on the hardware itself for fit and function.

One critical factor in assuring consistent quality is the number of dimensions the custom molder should track during processing. We at Caplugs recommend two, and suggest no more than three.

When applying tolerances, the following rules should be kept in mind:

- Fixed dimension tolerances apply individually to each fixed dimension by its own size.
- Closure dimension tolerances are determined by the largest closure dimension and this single tolerance is used for all other closure dimensions.
- Fixed and closure dimensions for a given table do not necessarily go together, and can be split between tables.
- Capability studies can be run with a cavity segment to aid our efforts in assigning tolerances for a given material. Please do not hesitate to contact us for assistance!

Although mold-cavity dimensions and the actual dimensions of the part will inevitably vary, an experienced custom molder can apply past experience with similar parts and specific material shrink rates to hold specified tolerances. For example, Caplugs combines technical details from previously run components and specific material shrinkage rates to the design of new molds.

**Basic Closure Dimension:**

This is the dimension across the parting of the molds. This dimension will always run with somewhat greater variation compared to the fixed dimensions within the cavities. (See Tool Cavity Cross-Section Sketch above.) The opening and closing of the mold has variations. This is recognized in the RMA tables.

**Fixed Cross-Sections:**

Long, relatively thin parts will run with more variation in their length. The dimensioning and tolerance should allow for a little stretch in installation. If the part is too long, it will not bunch or compress in place.

The engineering challenge is to cut a steel cavity that will reliably provide acceptable toleranced rubber parts. Given today’s close-tolerance, thin cross-section designs, your need for precision molded parts has never been more apparent.

Shrinkage occurs during molding of all rubber components and is a volume effect. Although built into the mold, it will vary depending on the part complexity within the same cavity. It occurs when the part is removed from the heated mold and allowed to cool. The engineering challenge is to cut a steel cavity that will reliably provide acceptable toleranced rubber parts. Given today’s close-tolerance, thin cross-section designs, your need for precision molded parts has never been more apparent.

Spring to almost rigid compounds (65 to 85 durometer) will shrink 1/2% to 2% allowing for tighter tolerances. Very soft rubbers (15 to 30 durometer) will be in a 3% to 4% shrink category.

general part inspection recommendations
Caplugs is the leader in custom molded components, masking solutions and product protection. With 10 manufacturing facilities and a large team of in-field sales managers across the globe, we provide the personalized service, range of capabilities, manufacturing expertise and scalable infrastructure to be your trusted partner.