

# Precision Molded Medical Components and Assemblies



# Superior Silicone Bonding Technology

At Minnesota Rubber and Plastics, we are more than a molder of high performance elastomers and thermoplastics to the medical industry. We provide the comprehensive services, in both engineering design and advanced materials development, required for the best end product possible. Our class 10,000 and 100,000 clean rooms and assembly services complement our high volume molded parts capabilities, and provide our customers with the critical quality and delivery requirements they have come to expect.

## Materials And Design Support For:

- Time To Market Needs
- Silicone Molding – Bonding
- High Performance Plastics
- Rubber to TPE Conversions
- Metal to Plastic Conversions
- Global Manufacturing
- Clean Room Molding – Assembly
- USP Class VI and FDA Compliant Compounds



## Applications Include:

- Valves
- Pumps
- Catheters
- Connections
- Diaphragms
- Plunger Tips
- Prosthetics
- Disposables
- Lab Equipment
- Diagnostic Products
- Surgical Instruments



## LSR (Liquid Silicone Rubber) Molding:

Components molded with LSR have many of the property characteristics of Millable Gum Silicone and Heat Cured Rubber (HCR) including:

- Excellent heat resistance up to +225°C/437°F
- Good resistance to steam, ozone, UV light, radiation and weathering
- Excellent electrical resistance
- Good resistance to aging
- Physical inertness
- High mechanical strength
- Thermoset material

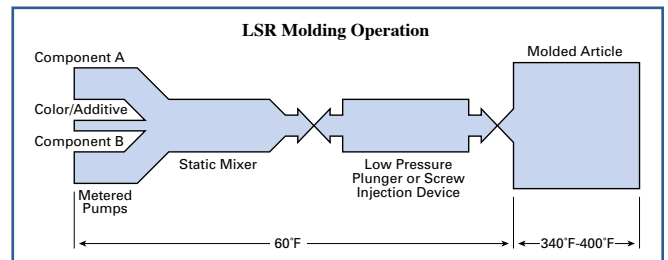


## Typical LSR Properties Include:

Press-cured ASTM slabs of selected LSR grades show the following typical properties:

Durometer	ASTM D2240	Shore A	10-80
Tensile Strength	ASTM D412	psi	1,150-1,750
Elongation at Break	ASTM D412	%	300-900
Tear Strength	ASTM D624B	ppi	115-250
Rebound Resilience	ASTM D1054	%	25-70
Compression Set (Not postcured.)	ASTM D395 22h/175°C	%	10-60

**Compression set at elevated temperatures can be improved by postcuring (4h/200°C/392°F) and will reach 10 to 25% (22h/175°C/347°F).**



*For design criteria request our Elastomers and Thermoplastics Engineering Design Guide.*

# Creating Value With Innovative Solutions

## Experience On Your Side

Our resources provide over 65 years of injection molding and manufacturing experience. Because of our unique ability to offer both rubber and plastic combination components, including complete assemblies, we can offer greater engineering design and production efficiencies thereby reducing development time, minimizing costs and decreasing your time-to-market. Our materials are compliant with ISO 10993, USP Class VI, and FDA requirements and we operate an ISO 13485:2003 certified quality management system.

What's more, we know how to maintain the integrity of your basic design while taking into consideration factors such as shrink distortion and parting lines. As the relationship between materials, parts, and end-use performance need to be addressed, we also know how to solve problems arising from torque valves and sealing contacts. We then ensure that the rubber and plastic materials complement each other's tolerance capabilities. Once the design is complete, we can follow through with testing using tools, such as FEA, where benefits include increased strength, decreased material usage and reduced costs.

## Design Services

Our state-of-the-art facilities offer comprehensive design services that advance your programs:

- Preliminary engineering assistance  
Mechanical design review
- Materials engineering  
Materials R&D  
Specialty compounds
- Rapid mold design  
and development  
Complete prototype services
- Design engineering  
Metal-to-plastic conversions  
Rubber-to-TPE conversions  
Plastic-to-Plastic
- Process engineering  
Mold flow analysis  
Functional testing  
Leak testing
- Assemblies



## Medical Grade Plastics

	Shore Hardness					Temperature Of Use (°C)																		
	A 40	50	60	70	80	95	D 15	20	30	40	50	60	70	50°	75°	100°	125°	150°	175°	200°	225°	250°		
<b>LDPE</b> Low density polyethylene																								
<b>HDPE</b> High density polyethylene																								
<b>PP</b> Polypropylene																								
<b>PVC</b> Poly Vinyl Chloride																								
<b>SEBS</b> Styrene Ethylene Butylene Styrene																								
<b>PA</b> Polyamide (Nylon)																								
<b>PUR</b> Polyurethane																								
<b>PC</b> Polycarbonate																								
<b>PSU</b> Polysulfone																								
<b>POM</b> Polyoxymethylene (acetal)																								
<b>PEEK</b> Poly ether etherketone																								
<b>PET/PBT</b> Polyethylene/butylene terephthalate																								

All materials listed are FDA approved for food contact.

## Talk To The Experts.

When your medical plastic or rubber design requirements seem impossible there's no one better to partner with than Minnesota Rubber and Plastics, we're here to make your tough application a reality.



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