STOCKWELL ELASTOMERICS

4749 Tolbut St. • Philadelphia PA. 19136
800.523.0123 • 215.335.3005 • f. 215.335.9433
www.stockwell.com email: service@stockwell.com

Silicone Sponge and Silicone Rubber Gaskets, Seals, Cushions, and Materials

Why Use Silicone Rubber?

Silicone rubber has the combined properties of resilience, high temperature stability, and general inertness, unavailable in any other elastomer. Silicones are generally unaffected by extended exposure to temperatures from -100º to 500ºF, and are also resistant to aging and degradation from sunlight and ozone.

Material Properties of Silicone Rubber

Long Term Compression Set Resistance

Properly designed Silicone Foam and Silicone Sponge outdoor enclosure gaskets can effectively seal out wind driven rain and dust – helping the designer meet NEMA enclosure and IP specifications. Unlike most organic elastomers such as EPDM and neoprene, silicone maintains its resiliency over a broad temperature range and resists taking a permanent compression set.

Flame Retardant Capabilities

Silicone Rubber can be compounded to be flame retardant and achieve UL94V0, UL94V1 and UL94HF1 certifications. Flame retardant closed cell silicone sponge and silicone foam gaskets are used in analytical instrumentation, telecommunications equipment and controls used in Mass Transit systems. Even when silicone rubber burns under extreme temperatures, the by-products are non-toxic and any residual ash continues to provide electrical insulation properties.

FDA Regulations

Silicone Rubber can be compounded using ingredients that meet FDA regulations for properties such as high tear strength and flexing using platinum based catalysts. These silicone products are often specified for healthcare, instrumentation, food processing and medical diagnostic equipment applications.

Electrical Conductivity

Silicone Rubber can be blended with nickel-graphite or silver plated aluminum particles for electrically conductive gaskets that provide EMI (electro-magnetic interference) Shielding for electronic communication equipment. Conductive silicone is available in sheets or custom molded gaskets.

Electro-Static Discharge (ESD)

Solid silicone rubber can be blended with semi-conductive carbon for ESD properties. Further, closed cell silicone sponge will accept a surface coating of conductive silicone for soft gaskets and pads with ESD grounding properties.

Thermal Conductivity

Silicone Rubber can be blended with ceramic powders such as alumina and boron nitride for thermal interface pads that help to dissipate heat from power generating devices in electronics. Thermal interface pads are typically fabricated from gel based silicones which are very soft and conformable.

Silicone – The Versatile Elastomer

The designer has a wide range of choices when selecting silicone rubber gasketing and cushioning materials.

- Solid silicone rubber is available in sheets or continuous rolls from .010" thick to .500" thick, and hardness from 10 Shore A to 80 Shore A. Molding compounds – especially liquid silicones – are readily pigmented to match color chips or Pantone color designations.
- Closed cell silicone sponge and silicone foam is available in continuous rolls from .032" thick to .500" thick and densities ranging from ultra soft to extra firm.
- Silicone Rubber is available in a broader range of firmness and densities than any other engineering elastomer.
- Fuel, oil and chemical resistant fluorosilicone is also available.

COHRlastic® is a Registered Trademark of CHR Industries, a unit of St. Gobain Performance Plastics
Bisco™ Silicones are produced by Rogers Corporation

Stockwell Elastomerics - On-Site Production Capabilities

Stockwell Elastomerics has chosen to develop broad production capabilities for in-house, fast turn manufacturing of prototypes and low-to-mid volume production runs to serve the needs of customers in the Technology Equipment Sector. This broad range of capabilities enables multiple approaches in solving design challenges and supporting initial production requirements. Stockwell Elastomerics' on-site silicone manufacturing capabilities include:

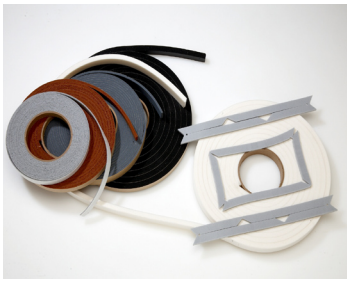
- Compression Rubber Molding of Silicone, Fluorosilicone and other specialty elastomers
- Injection Molding of Liquid Silicone Rubber into Gaskets and Components
- Water Jet Cutting of Gaskets from Silicone Foam, Silicone Sponge and Solid Silicone
- Die Cutting of Gaskets, Cushioning Pads and Insulators
- Application of Pressure Sensitive Adhesives onto Silicone Rubber
- Custom Laminations and Bonded Assemblies of Silicone Foam, Sponge and Solid
- Slitting to Width of Roll Materials into Adhesive Backed Silicone Foam Gasketing

Stockwell Elastomerics Can Help with Material Selection and Design

Stockwell Elastomerics stocks a full inventory of COHRlastic® solid and sponge silicone rubber and Bisco™ silicone foam and cast liquid silicone rubber. And Stockwell Elastomerics has teamed up with several other manufacturers of silicone compounds and products to provide a broad selection of additional silicone materials.
For new product applications, Stockwell Elastomerics has developed this material selection guide to help determine the best material options to meet new product performance demands.

Need prototypes cut from silicone sheet material? Send a dxf file to service@stockwell.com for water jet cut samples.

Silicone Sponge Rubber and Silicone Foam Materials



Closed Cell Silicone Sponge is heat cured from gum base silicone into molded sheets or rotocured into continuous rolls. High Quality silicone sponge is typically post-cured to improve mechanical properties and high temperature performance. Silicone sponge has a characteristic fabric impression on the skin surfaces. Silicone Sponge generally has better tear and tensile strength than cast silicone foams, making molded sponge a better choice for demanding mechanical applications.

Silicone Foam sheet materials are cast from liquid silicone compounds - which are catalyzed, rapidly mixed, cast onto a release liner and then cured at elevated temperatures. Many silicone foam materials pass UL94 flame ratings. Silicone foams have a smooth surface on one or both surfaces and can be provided from .032" through .500" thick in continuous rolls. Soft, low density grades of silicone foam are open cell foams, however the medium and higher density silicone foams can function as effective gaskets for sealing out weather and wind driven rain when enclosures are designed for appropriate gasket deflection.

Listing of Closed Cell Silicone Sponge

Product	Grade	Force Deflection*	Compression Set**	Stocked Color	.032"	.062"	.093"	.125"	.188"	.250"	.375"	.500"	Comments and Features
R-10480-S	Soft	2 - 7	5	Red	N/A	N/A	+	+	+	+	+	•	Low Compression Set and High Temperature
R-10470-M	Med.	6-14	25	Orange	+	+	+	+	+	+	+	+	High Quality/General Purpose
R-10480-M	Med.	6-14	5	Brown	N/A	+	•	+	+	+	+	+	Low Compression Set and High Temperature
R-10460-M	Med.	6-14	5	Blue/Gray	N/A	+	•	+	+	+	+	+	Low Compression Set/Flame Retardant UL94HB
R-10400-M	Med.	6-14	5	Blue/Gray	N/A	+	•	+	+	+	+	+	Low Compression Set/Flame Retardant UL94V0
S470-62-CON	Med.	6-14	10	Black	•	+	•	+	•	+	•	•	Conductive Silicone Surface Coating for ESD Properties
R-10450-M	Med.	6-14	25	Gray	N/A	+	•	•	•	N/A	N/A	N/A	Fiberglass Reinforcement Provides Dimensional Stability
R-10404-M	Med.	9-16	20	Green	+	+	•	+	•	•	N/A	N/A	Thermally Conductive for Heat Transfer over Irregular Surfaces
R-10490-M	Med.	9-16	40	Blue	+	•	+	+	N/A	N/A	N/A	N/A	Fluorosilicone, Solvent and Fuel Resistant
R-10470-F	Firm	12-20	25	Orange	N/A	•	•	+	+	+	•	N/A	High Quality/General Purpose
S-10418-XF	Extra Firm	18-24	10	Red	N/A	N/A	N/A	•	•	•	•	+	Extra Firm Density for Cushioning Heavy Loads

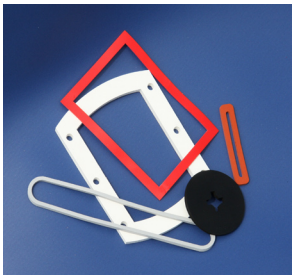
Listing of Cast Silicone Foams

Product	Grade	Force Deflection*	Compression Set**	Stocked Color	.032"	.062"	.093"	.125"	.188"	.250"	.375"	.500"	Comments and Features
BF2000	Ultra Soft	0.5-1.5	5	Black	N/A	N/A	N/A	+	+	+	+	•	Lightweight, Flame Retardant Foam Smooth Both Sides, UL94V0
F12	Very Soft	2-5	5	Gray	N/A	+	•	+	+	+	+	+	Lightweight, Flame Retardant Foam, Textured Finish, One Side, UL94V0
BF1000	Very Soft	1- 5	5	White	N/A	+	+	+	+	+	+	+	Lightweight, Flame Retardant Foam Smooth Both Sides, UL94V0
HT870	Soft	2 - 7	5	Black	N/A	+	+	+	+	+	•	•	Open Cell Silicone Foam with Smooth Surface, UL94V0
HT800	Med.	6 - 14	5	Gray	+	+	+	+	+	+	+	+	Closed Cell Silicone Foam with Smooth Surface, UL94V0
HT820	Firm	12 - 20	5	Gray	+	+	+	+	+	+	N/A	N/A	Closed Cell Silicone Foam with Smooth Surface, UL94V0
HT840	Extra Firm	16 - 26	5	Gray	N/A	+	+	+	•	+	N/A	N/A	Closed Cell Silicone Foam with Smooth Surface, UL94V0

* Compression Force-Deflection, PSI (Compressed 25% at 73°F) per ASTM D 1056.
** Compression Set, %, (Compressed 50% for 22 hours at 212°F) per ASTM D 1056.
+ Indicates thicknesses that are normally available from on-site inventory. Availability may vary.
• Materials and thicknesses shown are generally available; please call for estimated delivery cycle and minimum.
N/A Indicates thicknesses that are unavailable due to production constraints.

Other materials and thicknesses may be available by special order.
Most silicone sponge and foam products are available with acrylic or silicone polymer pressure sensitive adhesive. See selection on back page.
Data Sheets are available for each product, download from www.stockwell.com/DataSheets.

Solid Silicone Rubber Compounds



Solid Silicone Rubber Compounds are available in continuous rolls and/or sheets for die cut and fabricated components. All silicone sheet materials listed below are available with pressure sensitive adhesive backings.

Gum-based silicone materials are molded into sheets or cured in 36″ wide continuous rolls. These compounds meet industrial and military specifications such as A-A-59588, AMS specifications and ZZ-R-765b, ZZ-R-765/15C and ZZ-R-765E callouts. Contact Stockwell if you require assistance cross-referencing these specifications. Stockwell has gum-based silicone compounds that can be compression molded into 3-dimensional parts that have the same physical properties as the materials listed below.

Liquid Silicone Rubber (LSR) materials are available cast into 36″ wide continuous rolls or molded into 12″ x 12″ sheets. A sealing or cushioning design can be quickly prototyped using molded 12″ x 12″ sheets, then tooled up into a liquid injection molded (LIM) gasket for cost savings in production. Liquid silicone rubber compounds do not meet military specifications. However, for most gasketing applications on ruggedized equipment, LSR will perform as well as a gum-based silicone, resisting the effects of sunlight, ozone and aging due to oxidation and corrosion.

Listing of Gum Base Solid Silicone

Product	Durom-eter	Tensile	Color	.015″	.020″	.032″	.062″	.093″	.125″	.188″	.250″	.375″	.500″	Molded Sheets	Continuous Rolls	Comments and Features
COHR-300	30	800	Red	N/A	N/A	N/A	+	•	•	•	•	•	•	X		Compressible Gasketing
COHR-9030	30	850	Red	N/A	N/A	+	•	•	•	N/A	N/A	N/A	N/A		X	Compressible Gasketing
COHR-9235	30	1150	Gray	+	•	+	+	•	+	N/A	N/A	N/A	N/A		X	High Tear Strength 800% Elongation
SE30-GF	30	700	Gray	•	+	+	+	•	•	N/A	N/A	N/A	N/A		X	UL94HB Flame Rating
COHR 400	40	900	Red	N/A	N/A	N/A	•	•	•	+	+	•	+	X		Meets ZZ-R-765, Class 2a and 2b, Gr40
COHR 9040	40	900	Red	N/A	N/A	+	+	+	+	N/A	N/A	N/A	N/A		X	Meets ZZ-R-765, Class 2a and 2b, Gr40
COHR 500	50	700	Red	N/A	N/A	N/A	•	•	•	+	+	+	+	X		Meets ZZ-R-765, Class 2a and 2b, Gr50
COHR 9050	50	900	Red	•	•	+	+	+	+	N/A	N/A	N/A	N/A		X	Meets ZZ-R-765, Class 2a and 2b, Gr50
COHR 9255	50	1200	Gray	•	•	+	+	•	+	N/A	N/A	N/A	N/A		X	High Tear Strength, 600% Elongation
SE50-RS	50	850	Red	+	+	+	•	•	•	N/A	N/A	N/A	N/A		X	Calendered and Cured in Thin Gauges
SE50-BS	50	600	Black	•	•	+	+	•	•	N/A	N/A	N/A	N/A		X	Pigmented Black
SE50-LT1	50	1200	Red	•	•	+	+	•	+	N/A	N/A	N/A	N/A		X	Extreme Low Temp, Phenyl Base
SE50-WS	50	700	White	N/A	N/A	•	+	•	+	•	•	•	•	X	X	FDA Grade, Peroxide Free
COHR 600	60	700	Red	N/A	N/A	N/A	+	•	+	•	•	•	•	X		Meets ZZ-R-765, Class 2a and 2b, Gr60
HT-6360	65	300	Black	N/A	+	+	+	•	+	N/A	N/A	N/A	N/A		X	Meets UL94V0 flame rating
TC100	65	250	Light Blue	N/A	•	+	+	•	N/A	N/A	N/A	N/A	N/A		X	Thermally Conductive, 1.3 W/mK
SE65-CON	65	600	Black	N/A	+	+	+	•	+	•	+	•	•	X	X	Conductive for ESD Grounding, 5 ohm-cm Volume Resistivity
COHR 700	70	700	Red	N/A	N/A	N/A	•	•	•	+	+	•	•	X		Meets ZZ-R-765, Class 2a and 2b, Gr70
COHR 9070	70	750	Red	N/A	N/A	+	+	•	+	N/A	N/A	N/A	N/A		X	Meets ZZ-R-765, Class 2a and 2b, Gr70
COHR 9275	70	1200	Gray	N/A	N/A	+	+	•	•	N/A	N/A	N/A	N/A		X	High Tear Strength, 350% Elongation

Listing of Liquid Base Silicone Cast or Molded into Cured Sheet Stock

Product	Durom-eter	Tensile	Color	.010″	.020″	.032″	.062″	.093″	.125″	.188″	.250″	.375″	.500″	Molded	Continuous Rolls	Comments and Features
HT-6210	10	250	Gray	+	+	+	+	•	+	N/A	N/A	N/A	N/A		X	36″ wide continuous cast rolls
HT-6220	20	800	Black	+	+	+	+	•	+	N/A	N/A	N/A	N/A		X	36″ wide continuous cast rolls
SE2020	20	725	Gray	N/A	N/A	•	+	+	+	•	•	•	•	X		Molded 12″ x 12″ sheets
SE2030	30	1085	Black	N/A	N/A	•	+	+	+	•	•	•	•	X		Molded 12″ x 12″ sheets
HT-6135	35	800	Off-White	+	+	+	+	•	•	N/A	N/A	N/A	N/A		X	36″ wide continuous cast rolls
HT-6240	40	800	Clear	+	+	+	+	•	+	N/A	N/A	N/A	N/A		X	36″ wide continuous cast rolls
SE2040	40	1230	Black	N/A	N/A	•	+	•	+	•	+	+	•	X		Molded 12″ x 12″ sheets
SE2050	50	1230	Black	N/A	N/A	•	•	•	•	•	•	•	•	X		Molded 12″ x 12″ sheets

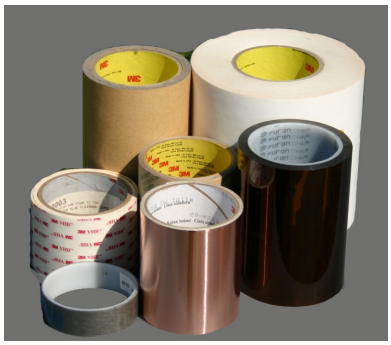
+ Indicates thicknesses that are normally available from inventory. Availability may vary.
• Materials and thicknesses shown are generally available; please call for estimated delivery cycle and minimum production run.
N/A Indicates thicknesses that are unavailable due to production constraints.

Most solid silicone sheets are available with acrylic or silicone polymer pressure sensitive adhesive. See selection on back page. Many other silicone compounds, such as extreme low temperature phenyl based silicones, and solvent and fuel resistant fluorosilicones, electrically conductive silicones and fluorosilicones for EMI Shielding and thermally conductive gap fillers are also available. All values are typical values and should not be used for writing specifications. Data Sheets are available for each product, download from www.stockwell.com/DataSheets.

Pressure Sensitive Adhesives

Selection of Pressure Sensitive Adhesives Most Often Provided on Silicone Foam, Closed Cell Silicone and Solid Silicone Rubber for Gaskets, Cushioning Pads and Sheet Materials

Stockwell Elastomerics has developed lamination processes to apply pressure sensitive acrylic adhesives onto silicone rubber sheet materials. Stockwell's broad selection offers the designer many options - experience shows that selecting the proper adhesive backing is often as important to the function of the gasket or cushioning pad as the base material.



Silicone Pressure Sensitive Adhesive or Acrylic Pressure Sensitive Adhesive?

Acrylic adhesives have a longer shelf life, generally cost less than silicone adhesives, and have better adhesion levels to most substrates. The silicone pressure sensitive adhesives listed here have film carriers that tend to resist migration and extend shelf life. Contact Stockwell for samples to evaluate specific adhesives on silicone materials.

Listing of Acrylic Adhesives				
Product	**Thickness**	**Adhesion Value**	**Temperature Range**	**Product Benefits**
256M	0.005	70 oz./inch	-40 to 200°F	High Tack supported adhesive, polyester film support provides dimensional stability. Specified for most die-cut thin sponge requirements
254M	0.003	40 oz./inch	-40 to 200°F	Slightly thinner version of 256M with a thicker paper backing. Backing permits "kiss cutting" over a larger surface area
467	0.002	80 oz./inch	-40 to 300°F	Low tack / high bond strength adhesive for requirements needing a thin bond line and potential shear forces
9485	0.005	150 oz./inch	-40 to 300°F	Medium initial tack/high ultimate strength transfer adhesive. Often laminated to silicone sponge rubber. High Performance bonding adhesive from 3M. . A favorite for demanding applications
9490LE	0.007	140 oz./inch	-40 to 225°F	Low Surface Energy, film supported adhesive for bonding gaskets to certain plastics and powder coated metal surfaces
9795B	0.006	78 oz./inch	-40 to 225°F	Black polyester carrier film gives this adhesive a black appearance, for gaskets on light seals and displays
9731	0.006	120 oz./inch	-40 to 225°F	Combination pressure sensitive adhesive, silicone one side and acrylic on the other side, used for primerless bonding to molded silicone gaskets with a flat surface
TR3	0.003	30 oz./inch	-40 to 250°F	Ceramic filled thermally conductive adhesive for bonding to R10404-M and other gum based thermally conductive silicones

Listing of Silicone Adhesives				
Product	**Thickness**	**Adhesion Value**	**Temperature Range**	**Product Benefits**
AR8458	0.004	40 oz./inch	-100 to 450°F	ULTEM® polyethermide film supported silicone polymer adhesive for hot and cold temperature conditions. Specially treated plastic liner releases from the adhesive surface. Available on silicone rubber die cut components.
DP-1001	0.005	58 oz./inch	-100 to 450°F	Kapton® film supported silicone polymer adhesive has amber tint. The liner release properties are somewhat improved over the AR8458 product.

Acrylic adhesives require approximately 12 hours of dwell time to attain full bonding strength. Silicones require up to 24 hours to attain full bonding strength and may appear to have little initial tack. Note: Shelf life of silicone pressure sensitive adhesives can be extended by storing at 40°F to 50°F.

Kapton® is a registered trademark of DuPont Performance Elastomers. ULTEM® is a registered trademark of General Electric Company.

Selected Surface Laminations Available on Silicone Foam and Silicone Sponge Rubber

Stockwell Elastomerics has years of experience working closely with many customers to enhance the properties of silicone foam or silicone sponge components. Stockwell has combined the properties of laminated thin films, foils and thin layers of solid silicone with cellular silicone products to achieve the features listed in the table below.

Listing of Surface Laminations			
Base Substrate	**Lamination Materials**	**Laminate thickness**	**Comments and Features**
Silicone Sponge	Teflon Coated Fiberglass Fabric	.005"	Non-stick, non-absorbing surface for hot melt or imprinting applications
Silicone Sponge	UHMW Film	.005" and .010""	Durable, low coefficient of friction surface
Silicone Sponge	Carbon Filled Conductive Silicone	.032"	Semi-conductive surface for ESD grounding and protection
Silicone Sponge	Liquid Silicone / Fiberglass	.012"	Durable and high grip surface for Transportation Cushioning Pads
Silicone Foam or Sponge	Thin, High Strength Silicone Rubber	.015" and .032"	Durable and flexible sealing surface used with cellular products for lightweight vacuum seals
Silicone Foam	PET or Polyimide Film	.002" and .005"	Enhances durability and/or provides additional dimensional stability
Silicone Foam	Formex Polypropylene	.005" and .010"	Stiffening and/or durable layer (UL Listed)
Silicone Foam	Aluminum or Copper Foil	0.002"	Conductive layer for EMI shielding

STOCKWELL ELASTOMERICS
4749 Tolbut St. • Philadelphia PA. 19136 • 800.523.0123
215.335.3005 • f. 215.335.9433 • www.stockwell.com • service@stockwell.com