

Elastomer Library

C&M Rubber Co. has a longstanding business relationship with many polymer suppliers, including Momentive (Formerly GE Silicone), Wacker Silicone, US Silicones, LLC, Valley Rubber Co. and Dow Corning. We have in-house capability to mix a silicone compound for your specific application. We can color match to the Pantone© Formula Guide and produce a custom compound with the durometer (hardness) granularity of ± 5 points. C&M Rubber Co. has a wide breadth of knowledge in developing compounds that can tolerate a wide range of temperatures, tear resistance, and compression set. From one pound to fifty-pound batches, C&M Rubber Co. can recommend and mix just the right elastomeric compound for your application.

Elastomers

The table below is a list of elastomeric materials that C&M Rubber Co. is currently using to produce items for current customers. This list is not intended to be a complete list of available options, rather an example of just some of the materials we have or are currently using.

| Material Name | Durometer | Notes | Food Contact |
|--|-----------|--|--------------|
| Momentive SE-6035 - Base | 35 | Used in blend of 6035 & 6075 to provide custom durometer between 35 & 70 Durometer | Yes |
| Momentive SE-6075 - Base | 75 | | |
| Momentive SE-6335 - High Strength | 30 | High strength – may use in blend of 6035, 6075 or other bases | Yes |
| Momentive SE-5559 U – Flame Retard. | 57 | Additive for flame retardency – Color brown only | No |
| Momentive SE-6916HA – Heat Age Stabilizer | N/A | Additive for Silplus® elastomers | N/A |
| Momentive Tufel® II - Platinum Cure | Various | Fast cure times- Popular with medical applications | Yes |
| Dow HS-30 – High Strength | 30 | Use alone or in blend with other bases | Yes |
| Dow HS-50 – High Strength | 50 | Use alone or in blend with other bases | Yes |
| Dow HS-70 – High Strength | 70 | Use alone or in blend with other bases | Yes |
| Dow GP-50 – Base | 52 | Smooth shiny surface finish | Yes |
| Dow NPC 40– No Post Cure | 40 | No post cure required | No |
| Dow NPC 80– No Post Cure | 80 | No post cure required | No |
| Dow Silastic® 160-60 Semi Conductive | 60 | Resistance values of 10.0 Ohm/Cm | No |
| Dow Silastic® LCS-755 | 55 | Low Compression Set | Yes |
| Dow LS-2840 – Fluorosilicone | 40 | MIL-R-25988B, Class 1, Grade 40 | No |
| Dow LS-2860 – Fluorosilicone | 80 | MIL-R-25988B, Class 1, Grade 60 | No |
| Shin-Etsu SG-135 U – Base | 35 | General Purpose Silicone Base | |
| Shin-Etsu SG-175-U – Base | 75 | General Purpose Silicone Base | |
| Neoprene, NBR, EPDM, Millable Urethane & Nitrile | 30-95 | Custom mix house for non-silicone compounds | Call |

If you are developing a product or component that requires UL and/or NSF Certification for food contact, C&M Rubber Co. will assist your organization in processing the required paperwork to apply for these certifications.

Common Elastomer Product Descriptions

Outlined below are selections of common elastomer product descriptions that may be helpful in an initial selection of a silicone or flourosilicone material for your project. It is not intended to be exhaustive, but give you a starting point for your investigation of common silicone bases and additives. For more complete information, contact C&M Rubber Co. for more specific information regarding your product requirement.

Momentive Performance Materials

PRODUCT DESCRIPTION - Silicone

SE 6035 and SE 6075 are general purpose Silplus® stocks which have durometers of 35 and 70 respectively. They are designed to accept moderate to high levels of reinforcing or extending fillers and additives for property variation. They can also be blended to provide durometers between 35 and 70. These silicone bases accept coloring pastes well allowing for custom color matching.

KEY PERFORMANCE PROPERTIES

- ✓ Simplicity and accuracy in compounding
- ✓ Formulation versatility to achieve end use requirements
- ✓ Easily compounded and fabricated using conventional techniques.
- ✓ CFR 177.2600 – FDA indirect food contact –Rubber articles intended for repeated use- FDA Reg, 21CFR177.2600

TYPICAL PRODUCT DATA

Typical Properties of Uncured Compounds

| Properties | SE-6035 | SE-6075 |
|--------------------------------------|-------------|-------------|
| Specific Gravity | 1.10 ± 0.03 | 1.21 ± 0.03 |
| Appearance | Translucent | Translucent |
| Polymer Classification (ASTM D-1418) | VMQ | VMQ |
| Williams Plasticity (ASTM D-926) | 180 | 425 |

Specifications

Typical Product Data values should not be used as specifications.

(A= Typical Physical Properties, B = Momentive Control Specifications)

| Formulation | | A | B | A | B |
|-----------------------|--|-----|-------|-----|------|
| SE-6035 | | 100 | 100 | | |
| SE-6075 | | | | 100 | 100 |
| DBPH-50 | | 0.8 | 0.8 | 0.8 | 0.8 |
| ASTM Reference Method | Press Cure 10 Min. @ 177°C (350°F) Post Cure 1 Hr. @200° C (400° F) | | | | |
| D2240 | Shore A Hardness | 34 | 30 ±5 | 74 | 75±5 |

| | | | | | |
|-------|-----------------------|------|------------|------|---------|
| D412 | Tensile Strength, psi | 1320 | 900 | 1350 | 1000 |
| | MPa | 9.1 | 6.2 | 9.3 | 6.9 |
| | Elongation, % | 750 | 450 | 420 | 150 |
| D624 | Tear Die, pli | 95 | 40 | 150 | 70 |
| | kN/m | 16.7 | 7.0 | 26.3 | 12.3 |
| | Specific Gravity | 1.10 | 1.10 ± .03 | 440 | 350-550 |
| D-926 | Williams Plasticity | 170 | 125-225 | 440 | 350-550 |

Typical Properties of Cured Compound

| Formulation of Test Specimens | | A | B | A | B |
|---|--|-----|-----|-----|-----|
| SE-6035 | | 100 | 100 | | |
| SE-6075 | | | | 100 | 100 |
| Curing Agent | | | | | |
| Bis(2,4 Dichlorobenzoyl) Peroxide level (50% active) | | 1.2 | | 1.2 | |
| Cure conditions 10 min. @ 142°C (287°F) 2,5 Dimethyl-2,5 Di(t-butyl peroxy)Hexane 100% active level | | | 0.4 | | 0.4 |
| Cure conditions 10 min. @ 177°C (350°F) | | | | | |

| ASTM Reference Method | Physicals | Typical Values | | | |
|--|---|----------------|------------|------------|------------|
| | Press Cure | A | B | A | B |
| D-2240 | Hardness, Shore A | 33 | 32 | 65 | 68 |
| D-412 | Tensile Strength, psi (MPa) | 1100 (7.6) | 1220 (9.1) | 1440 (9.9) | 1350 (9.3) |
| D412 | Elongation % | 820 | 750 | 520 | 450 |
| D-624 | Tear Resistance, Die B psi (kN/m) | 75 (13.2) | 95 (16.7) | 150 (26.3) | 150 (26.3) |
| D-395 | Compression Set % 22 Hrs. @ 177°C (350°F) | 35 | 29 | 35 | 26 |
| Heat Aging 70 Hrs @ 225°C (437°F) | | | | | |
| D-573 | Hardness, Shore A | 5 | 10 | 11 | 8 |
| | Tensile Strength, psi | 0 | -38 | -34 | -26 |
| | Elongation % | -25 | -52 | -45 | -40 |
| Oil Resistance ASTM#1 70 Hrs. @ 149°C (300°F) | | | | | |
| D-471 | Shore A, points change | -8 | -6 | -7 | -5 |
| | Tensile Strength, % change | -20 | -30 | -25 | -30 |
| | Elongation, % change | -20 | -15 | -25 | -35 |
| | Volume, % change | 5 | 5 | 6 | 5 |
| ASTM#3 70 Hrs. @ 149°C (300°F) | | | | | |
| | Volume, % change | 50 | 50 | 40 | 45 |
| Water Resistance 70 Hrs. @ 100°C (212°F) | | | | | |
| D-471 | Shore A, points change | 0 | 0 | 0 | 0 |
| | Volume, % change | -1 | 0 | 0 | -1 |

Additives

SILPLUS® Elastomeric System includes additives to modify the processing and/or cured physical properties of the compounding bases. For additional information, contact C&M Rubber Co.

- ✓ Heat Age Stabilizer- Used to improve the heat age resistance
- ✓ Flame Retardant – Used with compounding bases or blends to improve the flame retardance of the compositions.
- ✓ Tensile Strength Enhancer – Used to optimize tensile strength when extending fillers are used.

Dow Corning STI

Product Description – Silicone

SILASTIC® HS-30, HS-50 and HS-70 silicone rubber products are high strength stocks with high tensile and tear strengths, good resilience, toughness and abrasive resistance. These products are translucent and easily pigmented to most any color shade desired. Blending of these stocks results in intermediate hardness's between 30 and 70 durometer. These silicone bases accept coloring pastes well allowing for custom color matching. The silicone bases contain FDA-permitted ingredients for food contact use.

Typical Properties

| Methods | Physicals | SILASTIC HS-30 | SILASTIC HS-50 | SILASTIC HS-70 |
|-------------|----------------------------------|----------------|----------------|----------------|
| ASTM D 792 | Specific Gravity @ 25° (77°F) | 1.13 | 1.17 | 1.22 |
| ASTM D 2240 | Durometer Shore A-2 | 31 | 52 | 72 |
| ASTM 412 | Tensile Strength, psi (MPa) | 1240 (8.54) | 1290 (8.89) | 1365 (9.40) |
| ASTM 412 | Elongation, % | 1000 | 600 | 450 |
| ASTM 624 | Tear Strength, die B, ppi (kN/m) | 200 (35.0) | 195 (34.1) | 200 (35.0) |
| ASTM 2137 | Brittle Point, degrees | -73°C (-100°F) | -73°C (-100°F) | -73°C (-100°F) |

SILASTIC® HS-50

SILASTIC® HS-50 silicone rubber can be compounded with appropriate modifiers to meet the requirements of AMS-3347, ZZ-R-765B class 3b Grade 50 (will require waiver on crack growth), and ASTM D 200 9GE 512.

SILASTIC® HS-70

SILASTIC® HS-70 silicone rubber can be compounded with appropriate modifiers to meet the requirements of AMS-3349A (will require a waiver on resilience) and ZZ-R-765C Class 3b Grade 70.

While these products are recommended for these specifications, Dow Corning STI does not perform testing required to certify acceptance to these specifications. If requested, Dow Corning STI will perform certification tests. Contact C&M Rubber Co. for test charges.

Information for Manufacturers of Food Grade and Health Care Products

The components of these products are listed in 21 CFR 177.2600. This FDA regulation deals with rubber articles intended for repeated use in contact with food. The regulation contains limitations on extractibles which apply to the finished fabricated article. For this reason, compliance with such limitations is the responsibility of the user

Dow Corning STI

Product Description - Fluorosilicone

SILASTIC® LS2840 fluorosilicone rubber is a general purpose, 40 durometer base that exhibits excellent fluid resistance to hydrocarbon and silicone fluids. Additionally, it is serviceable over a wide temperature range. Properties include:

- ✓ Excellent swelling resistance
- ✓ Serviceable from -63°C to 175°C (-81°F to 347°F)
- ✓ High tensile and tear strength
- ✓ Low compression set

| Methods | Physicals | Measurement |
|------------|---|---------------|
| | Appearance | Off-White |
| ASTM D792 | Specific Gravity ² | 1.43 |
| ASTM D2240 | Durometer Shore A-2 | 40 |
| ASTM D412 | Tensile Strength, MPa (psi) | 9.31 (1350) |
| ASTM D412 | Elongation, % | 450 |
| ASTM D624 | Tear Strength, Die B KM/M (ppi) | 24.5 (140) |
| ASTM D395 | Compression Set, 22 hrs/177°C (350°F),% | 12 |
| ASTM D471 | Volume swell in ASTM reference Fuel B, 24 hrs/23°C (73°F),% | 17 |
| CTM 0157 | Shrink, % | 4.6 |
| ASTM D2137 | Brittle Point | -68°C (-90°F) |

Product Description

SILASTIC® LS2860 fluorosilicone rubber is a general purpose, 60 durometer base that exhibits excellent fluid resistance to hydrocarbon and silicone fluids. Additionally, it is serviceable over a wide temperature range. Properties include:

- ✓ Excellent swelling resistance
- ✓ Serviceable from -63°C to 175°C (-81°F to 347°F)
- ✓ High tensile and tear strength
- ✓ Low compression set

| Methods | Physicals | Measurement |
|------------|---|---------------|
| | Appearance | Off-White |
| ASTM D792 | Specific Gravity ² | 1.45 |
| ASTM D2240 | Durometer Shore A-2 | 60 |
| ASTM D412 | Tensile Strength, MPa (psi) | 8.79 (1275) |
| ASTM D412 | Elongation, % | 325 |
| ASTM D624 | Tear Strength, Die B KM/M (ppi) | 24.5 (140) |
| ASTM D395 | Compression Set, 22 hrs/177°C (350°F),% | 16 |
| ASTM D471 | Volume swell in ASTM reference Fuel B, 24 hrs/23°C (73°F),% | 17 |
| CTM 0157 | Shrink, % | 4.7 |
| ASTM D2137 | Brittle Point | -63°C (-81°F) |

ShinEtsu Silicone

Product Description

SG-135 is a 35 durometer general purpose silicone base and is one of a series of easy processing bases produced by ShinEtsu. It can be used in a variety of applications requiring finishing by molding, extruding or calendaring. Typical applications include:

- ✓ Roll Covers
- ✓ Spark plug boots
- ✓ Diaphragms
- ✓ O-ring and gaskets
- ✓ Articles which are required to meet various military and industrial specifications

Typical Properties

| Methods | Physicals | Measurement |
|---------------------------|---|---------------------|
| | Color | Natural |
| | Catalyzed with | DBPH ⁽¹⁾ |
| Press Cured Properties | | |
| | Specific Gravity ² | 1.11 |
| ASTM D2240 | Durometer Shore A | 28 |
| ASTM D412 | Tensile Strength, (psi) | 1950 |
| ASTM D412 | Elongation, % | 945 |
| ASTM D624 | Tear Strength, Die B (ppi) | 185 |
| ASTM D412 | 100% Modulus, (psi) | 63 |
| Post Cured, 4 Hrs @ 205°C | | |
| ASTM D2240 | Durometer Shore A | 34 |
| ASTM D412 | Tensile Strength, (psi) | 1652 |
| ASTM D412 | Elongation, % | 885 |
| ASTM D412 | 100% Modulus, (psi) | 79 |
| ASTM D624 | Tear Strength, Die B (ppi) | 157 |
| ASTM D395 | Compression Set %, 22 hrs. @177°C (351°F) | 26 |

(1) 2,5-dimethyl-2,5-di(t-butylperoxy) hexane 100% active, 1 phr KEP-12 – Press Cured 10 Min. @ 177°C (350°F)

Product Description

SG-175 is a 75 durometer general purpose silicone base and is one of a series of easy processing bases produced by ShinEtsu. It can be used in a variety of applications requiring finishing by molding, extruding or calendaring. Typical applications include:

- ✓ Roll Covers
- ✓ Spark plug boots
- ✓ Diaphragms
- ✓ O-ring and gaskets
- ✓ Articles which are required to meet various military and industrial specifications

Typical Properties

| Methods | Physicals | Measurement |
|---|--|---------------------|
| | | Color |
| | Catalyzed with | DBPH ⁽¹⁾ |
| Press Cured Properties | | |
| | Specific Gravity ² | 1.22 |
| ASTM D2240 | Durometer Shore A | 70 |
| ASTM D412 | Tensile Strength, (psi) | 1590 |
| ASTM D412 | Elongation, % | 400 |
| ASTM D624 | Tear Strength, Die B (ppi) | 152 |
| ASTM D412 | 100% Modlus, (psi) | 326 |
| Post Cured, 4 Hrs @ 205°C | | |
| ASTM D2240 | Durometer Shore A | 76 |
| ASTM D412 | Tensile Strength, (psi) | 1635 |
| ASTM D412 | Elongation, % | 353 |
| ASTM D412 | 100% Modlus, (psi) | 392 |
| ASTM D624 | Tear Strength, Die B (ppi) | 128 |
| ASTM D395 | Compression Set %, 22 hrs. @ 177°C (351°F) | 16 |
| (1) 2,5-dimethyl-2,5-di(t-butylperoxy) hexane 100% active, 1 phr KEP-12 – Press Cured 10 Min. @ 177°C (350°F) | | |
| Hot Air, aged 70 hrs @ 225°C | | |
| ASTM D573 | Hardness, points change | +5 |
| | Tensile Strength % change | -29 |
| | Elongation, % | -26 |
| #1 Oil, Aged 70 hrs. @ 149°C | | |
| ASTM D471 | Hardness, points change | -5 |
| | Tensile Strength % change | -17 |
| | Elongation, % change | -11 |
| | Volume, % change | +6 |
| #3 Oil, Aged 70 hrs. @ 149°C | | |
| | Volume, % change | +44 |

These results are not to be used in setting specifications.