

Silquest^{*} A-189 Silane

for rubber and elastomers

Product Description

Improvement in mineral-filled elastomer properties, including modulus, tensile and tear strength, heat buildup, abrasion resistance, resilience, compression set and cure time may be achieved with Silquest A-189 silane (gamma-mercaptopropyltrimethoxysilane). Silquest A-189 silane chemically bonds reinforcing minerals such as silica, clay, mica and talc to the polymer matrix. This silane is especially useful in sulfur-cured and metal oxide-cured elastomers. It can be used as a pretreatment on minerals or added at the time of compounding.

Typical Physical Properties

Physical Form	Clear liquid
Color	Light straw
Molecular Weight, g/mole	196.4
Specific Gravity, 25/25°C	1.057
Refractive Index, n_D 25°C	1.440
Boiling Point at 40 mm Hg, °C (°F)	93 (199)
Flash Point, Tag Closed Cup, ASTM D 93, °C (°F)	88 (190)

Momentive Performance Materials provides versatile materials as the starting point for our creative approach to ideas that help enable new developments across hundreds of industrial and consumer applications. We are helping customers

solve product, process, and performance problems; our silanes, fluids, elastomers, sealants, resins, adhesives, urethane additives, and other specialty products are delivering innovation in everything from car engines to biomedical devices.

From helping to develop safer tires and keeping electronics cooler, to improving the feel of lipstick and ensuring the reliability of adhesives, our technologies and enabling solutions are at the frontline of innovation.



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Potential Applications

Improved or equal performance in low-rolling resistance, silica-reinforced tread compounds can be achieved at lower silane loading levels when Silquest A-189 silane is substituted for commonly used polysulfide-type silanes. Mineral-reinforced articles such as shoe soles, rubber rollers and wheels, white sidewalls, and wire and cable insulation also can be produced with lower silane loadings. Reductions in cure accelerator systems and increased sulfur-donor concentrations may be necessary when Silquest A-189 silane is substituted for slower cure-rate polysulfide-type silanes. Silquest A-189 silane is soluble in methanol, ethanol, isopropanol, mineral spirits, acetone, benzene, toluene, xylene, and in water when suitable hydrolysis procedures are followed.

Performance

Representative performance properties of Silquest A-189 silane in elastomer systems are shown in Tables 1 and 2.

Table 1: Silica-Filled NR⁽¹⁾

Performance Properties ⁽²⁾	Silquest A-189 Silane PHR (PHF)		
	None	0.4 (0.8)	1.0 (2.0)
Hardness, Shore "A"	64	65	65
Elongation, %	700	680	640
300% Modulus, psi (MPa)	820 (5.65)	1160 (8.00)	1400 (9.65)
Tensile Strength, psi (MPa)	4360 (30.1)	4610 (31.8)	4820 (33.2)
"C" Tear, ppi	395	495	540
Heat Buildup at 100°C (212°F) ΔT, °C (°F)	18 (65)	6 (42)	-7 (19)
Permanent Set, %	29.4	11.3	8.4
NBS Abrasion Index	103	133	144

(1) 100 Smoked sheet, 50 precipitated silica, sulfur-cured

(2) Cured 20 min at 149°C (300°F)

Table 2: Clay-Filled CR (Chloroprene Rubber) Formulation⁽¹⁾

Performance Properties ⁽²⁾	Silquest A-189 Silane PHR (PHF)		
	None	0.15 (0.15)	0.5 (0.5)
Hardness, Shore "A"	59	61	63
Elongation, %	780	680	300
300% Modulus, psi (MPa)	610 (4.20)	1220 (8.41)	1980 (13.6)
Tensile Strength, psi (MPa)	1920 (13.2)	1800 (12.4)	1980 (13.6)
"C" Tear, ppi	210	290	240
Heat Buildup at 100°C (212°F) ΔT, °C (°F)	21 (69)	14 (57)	11 (51)
Permanent Set, %	4.0	1.2	1.2
NBS Abrasion Index	37	44	76

(1) Chloroprene rubber, 100 calcined clay, metal oxide-cured

(2) Cured 40 min at 153°C (307°F)

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Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

Product Safety, Handling and Storage

Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available at www.momentive.com or, upon request, from any Momentive Performance Materials representative. Use of other materials in conjunction with Momentive Performance Materials products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

Emergency Service

Momentive Performance Materials maintains an around-the-clock emergency service for its products. The American Chemistry Council (CHEMTREC), Transport Canada (CANUTEC), and the Chemical Emergency Agency Service also maintain an around-the-clock emergency service for all chemical products:

Location	Momentive Performance Materials Products	All Chemical Products
Mainland U.S., Puerto Rico	518.233.2500	CHEMTREC: 800.424.9300
Alaska, Hawaii	518.233.2500	CHEMTREC: 800.424.9300
Canada	518.233.2500	CANUTEC: 613.996.6666 (collect) or CHEMTREC: 800.424.9300
Europe, Middle East, Africa	+32.(0)14.58.45.45 (Belgium)	CHEMTREC: +1-703.527.3887 (collect)
Latin America, Asia/Pacific, all other locations worldwide	+518.233.2500	CHEMTREC: +1-703.527.3887 (collect)
At sea	Radio U.S. Coast Guard, which can directly contact Momentive Performance Materials at 518.233.2500 or CHEMTREC at 800.424.9300.	

DO NOT WAIT. Phone if in doubt. You will be referred to a specialist for advice.

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