

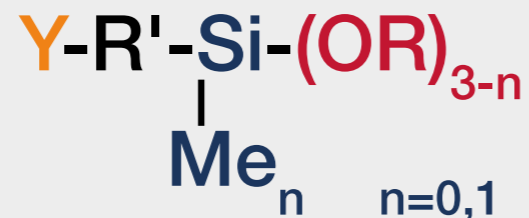


Commercial Silanes

STRUCTURES & TYPICAL USES

MOMENTIVE[®]

Structures of organofunctional silane



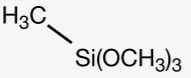
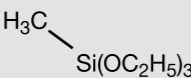
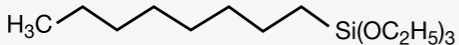
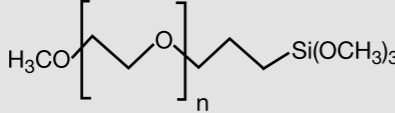
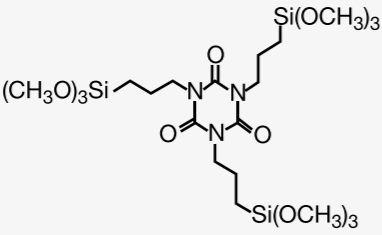
Y (ORGANIC REACTIVE) GROUP

- Epoxide
- Methacrylate
- Mercaptan (SH)
- Blocked mercapto
- Primary amine
- Alkyl and aryl amine
- Alkyl
- Isocyanate
- Urea
- Vinyl

OR (HYDROLYZABLE) GROUP

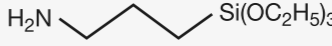
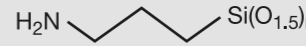
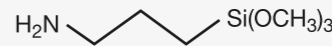
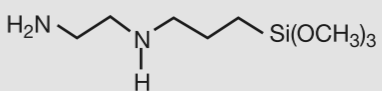
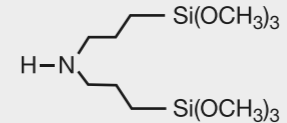
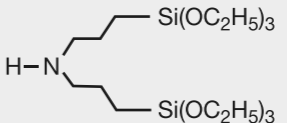
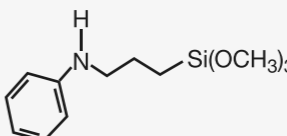
- Me-O-
 - Et-O-
 - MeO-CH₂-CH₂-O-
- Each example is commercial in at least one permutation

NON-ORGANOREACTIVE

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|---|--|--|
| Silquest™ A-1630 Silane Methyl trimethoxysilane | Methyl, trimethoxy  | Dessicant, mineral surface treatment and dispersion agent for mineral fillers. |
| Silquest A-162 Silane Methyl triethoxysilane | Methyl, triethoxy  | Water repellent surface treatments. |
| Silquest A-137 Silane Octyl triethoxysilane | Alkyl, triethoxy  | Alkali resistant hydrophobic surface treatments for masonry, dispersion agent for mineral fillers. |
| Silquest A-1230 Silane Proprietary non-ionic silane dispersing agent | Alkyleneoxide, trimethoxy  | Reactive wetting and dispersing agent; used in SMC, excellent dispersion in WB system for fillers and pigments. |
| Silquest A-Link™ 597 Silane Tris-[3-(trimethoxysilyl)propyl] isocyanurate | Isocyanurate, tris-(trimethoxy)  | Adhesion promoter for difficult substrates, such as metal surfaces, plastics or wood, adhesion promoter for hot melt adhesive. |

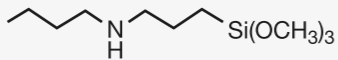
General use: mineral surface and filler treatment for coupling and dispersion.

AMINO

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|--|---|--|
| Silquest A-1100™/ A-1101 / A-1102 Silane (techn. grade) Gamma-aminopropyl triethoxysilane | Amine (primary), triethoxy  | Versatile bonding additive and coupling agent for amino reactive resins. |
| Silquest VS-142 Silane / e-free™ 1100 (Concentrated Form) Aqueous aminoalkyl siloxane solution | Amine (primary), Silanol  | Waterborne coatings, adhesives, sealants and primers. |
| Silquest A-1110 Silane Gamma-aminopropyl trimethoxysilane | Amine (primary), trimethoxy  | Versatile bonding additive and coupling agent for amino reactive resins. |
| Silquest A-1120J Silane N-(beta-aminoethyl)-gamma-aminopropyl trimethoxysilane | Amine (prim./sec.), trimethoxy  | General purpose bonding and adhesion promoter. Coupling agent in phenolic and epoxy compounds. |
| Silquest A-1126 Silane Proprietary mixture of amino organofunctional silane (40% in methanol) | Amine (prim./sec.) trimethoxy Proprietary | Versatile bonding additive and coupling agent for amino reactive resins. |
| Silquest A-1128 Silane Proprietary mixture of amino organofunctional silane (50% in methanol) | Amine (prim./sec.) trimethoxy Proprietary | Versatile bonding additive and coupling agent for amino reactive resins. |
| Silquest A-1130 Silane Triamino-organofunctional silane | Amine (prim./sec.), trimethoxy | General purpose bonding additive; excellent candidate to consider for PVC plastisols. |
| Silquest A-1170 Silane (Tech. grade Y-9627) Bis-(gamma-(trimethoxysilyl)propyl) amine | Amine (secondary), Di-(trimethoxy)  | Good adhesion to difficult substrates; efficient cross-linking agent used for PU prepolymer endcapping. |
| Silquest A-Link™ 600 Proprietary amino organofunctional silane | Amine (primary), trimethoxy proprietary | General purpose bonding and adhesion promoter for amino reactive resins, especially suited for SPUR+™ prepolymer and other silylated polymer based formulations. |
| Silquest Y-11699 Silane Bis-[Gamma-(triethoxysilyl)propyl] amine | Amine (secondary), Di-(triethoxy)  | Good adhesion to difficult substrates; efficient cross-linking agent PU and epoxy prepolymer endcapping. Methoxy free. |
| Silquest Y-9669 Silane N-phenyl-gamma-aminopropyl trimethoxysilane | Amine (secondary), (trimethoxy)  | Coupling agent with high thermal resistance and good wet-out properties; PU prepolymer endcapping, good adherence to metal surfaces. |

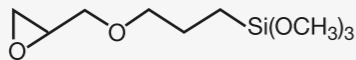

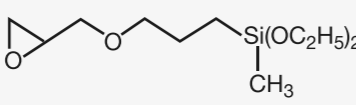
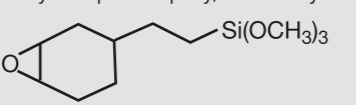
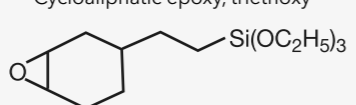
General use: general purpose bonding additives, cross-linking agents and coupling agents. May be considered for a wide variety of resins.

AMINO

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|---|--|---|
| Silquest A-Link 17 Silane Gamma-N-Butylaminopropyltrimethoxysilane | Amine (secondary), trimethoxy  | Adhesion promoter and cross-linking agent for coatings and adhesives, endcapper for use in low modulus SMP sealants, provides high flexibility and good thermal resistance. |
| Silquest™ VX-225 Silane Amino-functional oligosiloxane | Diamino (primary), ethoxy Proprietary | Efficient adhesion promoter for PU and silicones, good flexibility. Hydrophobic. |
| Silquest Y-15744 Silane | Diamino (primary), methoxy/ethoxy Proprietary | Efficient adhesion promoter, improved performance on aluminum, concrete and plastic substrates, both in dry and wet conditions. |
| Silquest A-Link 235 Proprietary silane amino functional oligosiloxane | Diamino, methoxy (primary, secondary) Proprietary | Efficient adhesion promoter. Improved performance on concrete and plastic substrates, both in dry and wet conditions. |
| Silquest A-1387 Silane Proprietary polyazamide silane (50% in methanol) | Amine (prim./sec.), n-(tri alkoxy) Proprietary | Coupling agent, protective and lubricant additive. Mineral surface pretreatment. |
| Silquest A-2387 Silane Proprietary polyazamide silane (50% in ethanol) | Amine (prim./sec.), n-(tri alkoxy) Proprietary | Coupling agent, protective and lubricant additive. Mineral surface pretreatment. |

General use: general purpose bonding additives, cross-linking agents and coupling agents. May be considered for a wide variety of resins.

EPOXY

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|---|---|---|
| Silquest A-187™ Silane Gamma-glycidoxypropyl trimethoxysilane | Gamma-Glycidoxy, trimethoxy  | Reactive bonding additive and coupling agent for polyurethane, epoxy, polysulfide and acrylic resins. |
| Silquest A-1871 Silane Gamma-glycidoxypropyl triethoxysilane | Gamma-Glycidoxy, triethoxy  | Reactive bonding additive, coupling and cross-linking agent for waterborne systems. Corrosion protection on metal. |
| CoatOSil™ 2287 Silane Gamma-glycidoxypropyl methyl diethoxysilane | Gamma-Glycidoxy, diethoxy  | Coupling and cross-linking agent for waterborne systems; used in acrylic SBR and PU adhesives. |
| Silquest A-186 Silane Beta-(3,4-epoxycyclohexyl)-ethyl trimethoxysilane | Cycloaliphatic epoxy, trimethoxy  | Coupling agent for epoxy composites; compatible with cationic cure chemistries. |
| CoatOSil 1770 Silane Beta-(3,4-epoxycyclohexyl)-ethyl triethoxysilane | Cycloaliphatic epoxy, triethoxy  | Coupling and cross-linking agent for waterborne systems; used in anionic latexes and dispersions (acrylic, PUD, epoxy,...). |

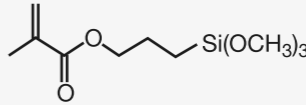
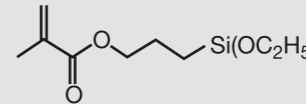
General use: bonding, cross-linking and coupling agents, excellent candidate to consider for carboxy and amino functional resins.

EPOXY

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|---|--|--|
| CoatOSil™ MP 200 Silane Gamma-glycidoxypropyl Silane Oligomer | Gamma-Glycidoxy, methoxy oligomer Proprietary | Coupling and cross-linking agent for WB and SB systems. Used in anionic latexes and dispersions. Corrosion protection. Metallic pigment and filler treatment. |

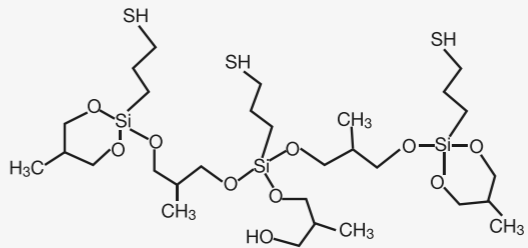
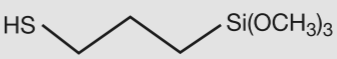
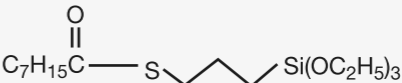
General use: bonding, cross-linking and coupling agents, excellent candidate to consider for carboxy and amino functional resins.

METHACRYL

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|--|--|--|
| Silquest™ A-174NT/ Silquest A-174 Silane Gamma-Methacryloxypropyl trimethoxysilane | Methacryl, trimethoxy  | Comonomer in radical cured resins, such as acrylic, polyester, methacrylate and PVC. Coupling agent for reinforced and filled polyester and acrylics. |
| Silquest Y-9936 Silane Gamma-Methacryloxypropyl triethoxysilane | Methacryl, triethoxy  | Cross-linking and coupling agent in radical cured resins. |
| Silquest A-178 Silane Methacryl amido Propyl (methoxy, ethoxy)silane | Methacrylamido, methoxy-ethoxy Proprietary | Comonomer in radical cured resins, such as acrylic, polyester, methacrylate and PVC. Coupling agent for reinforced and filled polyester and acrylics. Emulsion polymerization. |

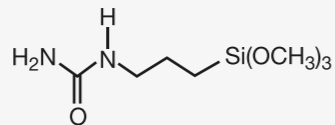
General use: bonding additives, cross-linking and coupling agents for radical cured resins, excellent candidate to consider for UV cured systems.

SULFUR

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|--|--|--|
| CoatOSil T-Cure Mercapto Silane Oligomer |  | Crosslinker and adhesion promoter for coating, adhesive and sealant applications. Can be used in PU, epoxy and sulfur-based systems. |
| Silquest A-189 Silane Gamma-mercaptopropyl trimethoxysilane | Mercapto, trimethoxy  | Adhesion promoter in automotive windshield sealants (PU). Crosslinker and adhesion promoter for epoxy and PU Coatings. |
| Silquest A-Link™ 599 Silane 3-Octanoylthio-1-propyltriethoxysilane | Alkylthiocarboxylate, triethoxy  | Bonding additive for contaminated surfaces. |

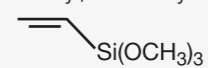
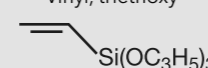
General use: bonding additives, cross-linking agents and coupling agents mainly used for mineral filled rubber compounds, as in polysulfide, nitrile, neoprene, polyurethane, epoxy and urea-formaldehyde resins.

UREIDO

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|--|---|--|
| Silquest™ A-1524CF Silane Gamma-ureidopropyl trialkoxysilane | Ureido, trimethoxy  | Bonding additive for contaminated surfaces, Insulation wools and foundry resins. Produced to be free of ethyl carbamate. |

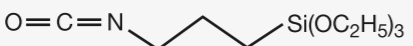
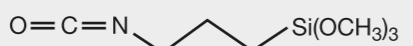
General use: amino reactive resins, such as polyurethanes, epoxy melamine and polyamide, requiring a long pot-life.

VINYL

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|---|--|---|
| Silquest A-171™ Silane (A-171B higher purity) Vinyl trimethoxysilane | Vinyl, trimethoxy  | Cross-linking agent for PE, moisture scavenger; coupling agent for unsaturated polyesters. |
| Silquest A-151 Silane Vinyl triethoxysilane | Vinyl, triethoxy  | Coupling and cross-linking agent for free radical cured resins, polyolefins and composites. |
| Silquest Y-15866 Silane Vinyl Glycolic silane, oligomer | Vinyl, oligomer Proprietary | Cross-linking agent for PE, moisture scavenger; Coupling and cross-linking for free radical cured resins, polyolefins and composites. |
| Silquest RC-1 Silane Proprietary vinyl-organofunctional silane | Vinyl, trimethoxy Proprietary | Coupling and cross-linking agent for free radical cured resins, polyolefins and composites. |
| Silquest VX-193 Silane Proprietary vinyl-organofunctional silane | Vinyl, trimethoxy Proprietary | Coupling and cross-linking agent for free radical cured resins, polyolefins and composites. |

General use: dessicants, comonomers in free radical cured resins, crosslinkers in polyolefins, coupling agents for mineral filled thermoplastics and elastomers.

ISOCYANATO

| NAME | ORGANIC FUNCTION SILANE FUNCTION | TYPICAL USE |
|---|--|---|
| Silquest A-Link™ 25 Silane Gamma-isocyanatopropyl triethoxysilane | Isocyanate, triethoxy  | Bonding additive and polymer endcapping. |
| Silquest A-Link 35 Silane Gamma-isocyanatopropyl trimethoxysilane | Isocyanate, triethoxy  | Cross-linking agent used in silylated PU. |

General use: bonding additives and cross-linking agents may be excellent candidates for polyurethanes, amino and hydroxy functional resins; stable in isocyanate resins.



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