

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, and European Community Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

<u>TRADE NAME (AS LABELED):</u>	A-174
<u>CHEMICAL NAME/CLASS:</u>	Organosilane Ester
<u>CHEMICAL FORMULA:</u>	CH ₂ CCH ₃ COO(CH ₂) ₃ Si(OCH ₃) ₃
<u>PRODUCT USE:</u>	Adhesion Promotion
<u>U.S./DISTRIBUTOR'S NAME:</u>	SPECIALTY COATING SYSTEMS, INC.
<u>ADDRESS:</u>	7645 Woodland Drive Indianapolis, IN 46278-2707 317/244-1200
<u>BUSINESS PHONE:</u>	
<u>EUROPEAN DISTRIBUTOR'S NAME:</u>	Specialty Coating Systems Limited
<u>ADDRESS:</u>	A1 Kingswey Business Park Forsyth Road, Sheerwater Woking, GU21 5SA United Kingdom
<u>BUSINESS PHONE:</u>	011-44-1483-541000
<u>FACSIMILE (FAX):</u>	011-44-1483-541050
<u>EMERGENCY NUMBER:</u>	CHEMTREC: 1-800-424-9300 INTERNATIONAL: 1-703-527-3887
<u>DATE OF PREPARATION:</u>	November 12, 1996
<u>DATE OF REVISION:</u>	August 22, 2013

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	EINECS #	%w/w	EXPOSURE LIMITS IN AIR					
				ACGIH-TLV		OSHA-PEL		NIOSH IDLH ppm	OTHER ppm
				TWA ppm	STEL ppm	TWA ppm	STEL Ppm		
Gamma-Methacryloxypropyltrimethoxysilane CAS NAME: 2-Propenoic acid, 2-methyl-3-(trimethoxysilyl)propyl ester	2530-85-0	219-785-8	> 98%	NE	NE	NE	NE	NE	NE
Methanol	67-56-1	200-659-6	< 0.2%	200 (Skin)	250 (Skin)	200	250 (Vacated 1989 PEL) (Skin)	6000	NIOSH RELs: TWA = 200 (skin) STEL = 250 (skin)

NE = Not Established.

See Section 16 for Definitions of Terms Used.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: DANGER! Harmful or fatal if swallowed. Harmful by inhalation of mist. May cause allergic skin reaction. May cause blindness if swallowed. May cause drowsiness or dizziness. May cause heart muscle damage. May cause damage to the liver and kidneys.

Form: Liquid

Color: Pale Yellow

Odor: ester like

ROUTES OF EXPOSURE: Ingestion, Dermal, Inhalation. The anticipated symptoms of overexposure to this product, via route of exposure, are indicated below.

INHALATION: Short-term harmful health effects are not expected from vapor generated at ambient temperature. However, this material is capable of forming methanol if hydrolyzed. Methanol vapor may cause dizziness, drowsiness, disturbances of vision, and tingling, numbness, and shooting pains in the hands and forearms.

Long term repeated overexposure to methanol vapor concentrations of 3000 ppm or greater may allow a cumulative effect to occur with resulting nausea, vomiting, headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, clouded and double vision. Liver and/or kidney injury may occur. Prolonged overexposure at levels of 800-1000 ppm may result in severe eye damage in some persons.

CONTACT WITH SKIN: May cause the following effects: allergic skin reaction in sensitized individuals-hypersensitivity reactions. These reactions may be delayed. Prolonged and/or repeated contact may result in defatting, drying and cracking of skin.

EYES: May cause eye irritation. May cause the following effects: stinging-excess blinking-tear production-excess redness of the conjunctivae swelling of the conjunctivae.

INGESTION: Acute oral exposure (i.e., ingestion of significant quantities) during organogenesis may lead to increased reproductive risk. This product hydrolyzes in the stomach to form methanol. Methanol may cause nausea, abdominal pain, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behavior, visual disturbances, drowsiness, coma and death. There may be a delay of several hours between swallowing methanol and the onset of signs and symptoms. The effects observed are in part due to acidosis and partially to cerebral edema. Visual effects include blurred vision, diplopia, changes in color perception, restriction of visual fields, complete blindness. Ingestion of moderate quantities of methanol also produces metabolic acidosis. Onset of symptoms may be delayed up to 48 hours. 60-200ml methanol is fatal dose for most adults. Ingestion of as little as 10ml methanol has caused blindness. With massive overdoses, liver, kidney and heart muscle injuries have been described.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing dermatitis, other skin conditions, eye disorders, respiratory conditions such as asthma or emphysema may be aggravated by over-exposure to this product. May aggravate liver and/or kidney problems.

CHRONIC EFFECTS/CARCINOGENICITY: Prolonged or repeated skin exposures can cause dermatitis (dry, red skin). This product can cause sensitization in susceptible individuals. Subsequent contact after initial sensitization can result in allergic reactions. Refer to Section 11 (Toxicological Information) for additional information. Chronic low level exposure via inhalation may result in chronic inhalation of Methanol. Adverse effects on the central nervous system, liver, kidneys and heart tissue and eye damage. This product or one of its ingredients present at 0.1% or more is not listed as a carcinogen or suspected carcinogen by NTP, IARC or OSHA.



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	(BLUE)	2
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FLAMMABILITY	(RED)	1
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REACTIVITY	(YELLOW)	1
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PROTECTIVE EQUIPMENT	C
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EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

**See Section 16 for
Definition of Ratings**

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

SKIN EXPOSURE: If this material contaminates the skin, begin decontamination with running water. Recommended flushing is for 15 minutes if any sign of skin irritation develops. Promptly remove clothing if soaked through and flush skin with water. Wash contaminated clothing before reuse. Get medical attention.

EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Do not interrupt flushing. Victim must seek medical attention.

INHALATION: If mists or sprays of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Call a physician or poison control center immediately.

INGESTION: If fully conscious, have victim drink plenty of water. **DO NOT INDUCE VOMITING. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.** If vomiting occurs, have victim lean forward to reduce risk of aspiration.

RECOMMENDATIONS TO PHYSICIANS: This product reacts with moisture in the acid contents of the stomach to form methanol. The combination of visual disturbances, metabolic acidosis and formic acid in the urine is evidence of methanol poisoning. Consider the signs/symptoms of methanol poisoning and also observe the known latency period of several days.

5. FIRE-FIGHTING MEASURES

FLASH POINT: (Tag Closed Cup) 108°C (226°F)

AUTOIGNITION TEMPERATURE: Not determined.

FLAMMABLE LIMITS (in air by volume, %): Lower: Not determined.
Upper: Not determined.

FIRE EXTINGUISHING MATERIALS: All standard extinguishing agents are suitable.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is a combustible liquid. This product can react in contact with water. Water should be used for the cooling of containers only. When involved in a fire, this material may decompose and produce irritating vapors, acrid smoke, and toxic gases (carbon dioxide, carbon monoxide, silicon oxide).

Explosion Sensitivity to Mechanical Impact: No

Explosion Sensitivity to Static Discharge: Not expected.

SPECIAL FIRE-FIGHTING PROCEDURES: Firefighters must wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus with full face mask and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

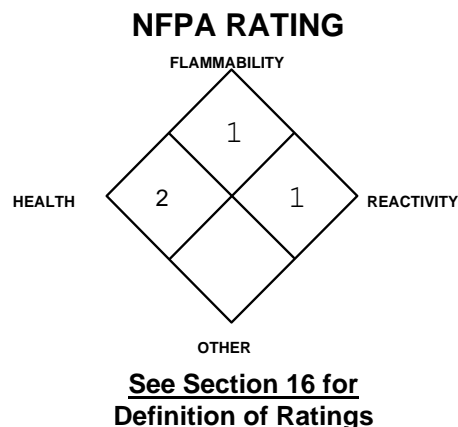
ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wipe, scrape or soak up in an inert material and put in a container for disposal. Wash walking surfaces with detergent and water to reduce slipping hazard. Wear proper personal protective equipment as specified in Section 8. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13, Disposal Considerations). Do not allow runoff to sewer, waterway or ground.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Avoid contact with skin and eyes. Keep out of reach of children. Attention: Not for injection into humans.

STORAGE AND HANDLING PRACTICES: Store containers in a cool, dry location, away from direct sunlight, or sources of intense heat. Keep container closed. Store in original container.



8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Use a mechanical fan or vent area to outside. General (mechanical) room ventilation is expected to be satisfactory if handled at low temperatures or in covered equipment. Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients) if applicable. If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134 or applicable state/governmental regulations. Supplied air respirators may be required for non-routine or emergency situations.

EYE PROTECTION: Splash goggles or safety glasses with side shields should be worn.

HAND PROTECTION: Use chemical resistant gloves.

BODY PROTECTION: Use body protection appropriate for task.

9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY (air = 1): > 1

EVAPORATION RATE (nBuAc = 1): < 1

SPECIFIC GRAVITY (water = 1): 1.045

FREEZING POINT: -48°C (-54°F)

SOLUBILITY IN WATER: Reactive

BOILING POINT @ 760 mm Hg: 255°C (491°F)

VAPOR PRESSURE @ 20°C: < 1

pH: Not available.

MOLECULAR WEIGHT: 248.1

VISCOSITY: 2.4 cSt

APPEARANCE AND COLOR: This product is a clear, pale yellow liquid, which has a characteristic, organic ester odor.

10. STABILITY and REACTIVITY

STABILITY: Stable, as packaged. Can polymerize if stored for a long period of time.

DECOMPOSITION PRODUCTS: Thermal decomposition of this product can produce irritating vapors and toxic gases (i.e. carbon monoxide, silicon oxides, and carbon dioxide).

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product will react with water, strong oxidizing agents, metal salts, alkaline compounds, free radical initiators such as peroxides. Combination with these compounds may cause exothermic polymerization or degradation of the product.

HAZARDOUS POLYMERIZATION: Can occur.

CONDITIONS TO AVOID: Contact with or exposure to incompatible chemicals, elevated temperatures, sparks, flames.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The specific toxicology data available for the components of this product present in greater than 1 percent concentration are presented below:

ACUTE ORAL: LD50; Species: Rat; >2,000 mg/kg; Remarks: slightly toxic

ACUTE DERMAL: LD50; Species: Rat; >2,000 mg/kg; Remarks: slightly toxic

ACUTE INHALATION: Remarks: No data available

11. TOXICOLOGICAL INFORMATION (Continued)

Inhalation studies in laboratory animals have shown that repeated exposures to high concentrations of a respirable, aqueous aerosol of the hydrolysis and condensation products of gamma-methacryloxypropyltrimethoxysilane may cause a chronic inflammatory reaction in the larynx.

Dermal hypersensitivity testing involving extensive injection and topical exposure (Guinea Pig Maximization Study) suggested a slight potential for sensitization.

SUSPECTED CANCER AGENT: The components of this product are NOT found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

SENSITIZATION TO THE PRODUCT: This product is a potential skin sensitizer in susceptible individuals.

MUTAGENICITY: In *vitro* studies have shown this product not to be mutagenic, but a clastogenic effect was observed in cultured cells. The relevance of these data to humans is unclear. Further studies are on-going.

REPRODUCTIVE TOXICITY: In a development study in rats, repeated oral gavage exposures to high concentrations of this product during gestation resulted in significant maternal and fetal toxicity, including malformations. However, fetal effects were not observed in absence of maternal toxicity. The no effect level (NOEL) for maternal and fetal effects was 0.5 ml/kg/day.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: This product will degrade slowly under ambient environmental conditions.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful or fatal to contaminated plant and animal-life, especially if large quantities are released.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product may be harmful or fatal to contaminated aquatic plant and animal life. Currently, no aquatic toxicity data are available for the components of this product.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT REGARDED AS DANGEROUS GOODS ACCORDING TO THE NATIONAL AND INTERNATIONAL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS.

15. REGULATORY INFORMATION

INVENTORIES

Australia Inventory of Chemical Substances	y (positive listing)
EU list of existing chemical substances	y (positive listing)
Japan ENCS inventory	y (positive listing)
China Inventory of Existing Chemical Substances	y (positive listing)
Korea Existing Chemicals Inventory (KECI)	y (positive listing)
Canada DSL Inventory	y (positive listing)
Canada NDSL Inventory	n (negative listing)
Philippines Inventory of Chemicals (PICCS)	y (positive listing)
TSCA list	y (positive listing)

US REGULATORY INFORMATION

SARA (311,312) Hazard Class- Acute Health Hazard; Chronic Health Hazard

California Proposition 65- WARNING! This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

CANADIAN REGULATORY INFORMATION

WHMIS Classification- D2A- Very Toxic Material Causing Other Toxic Effects

D2B- Toxic Material Causing Other Toxic Effects

16. OTHER INFORMATION

DATE OF PRINTING:

August 22, 2013

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Specialty Coating Systems, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, Specialty Coating Systems, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

TLV - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (**Federal Register**: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL.

NIOSH is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). **Flammability Hazard:** **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). **Reactivity Hazard:** **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures). PPE Rating B: Hand and eye protection is required for routine chemical use.

NATIONAL FIRE PROTECTION ASSOCIATION: **Health Hazard:** **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). **Flammability Hazard and Reactivity Hazard:** Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature:** The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **Ecological Information:** **EC** is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA: This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDL**); the U.S. Toxic Substance Control Act (**TSCA**)