Material Safety Data Sheet

Kleguard EMI Coating

SECTION 1: Chemical Product and Company Identification

MSDS Name: Kleguard Sprayable Solution

Company Identification: Optic Clear Solutions
467 Paseo
Anaheim, CA.

Emergency Assistance: 800-222-1222 Poison Control Center

SECTION 2: Composition, Information on Ingredients

Chemical Name	Composition by Weight	Relative Hazard
Tetrahydrofuran	84%	Flammable/Toxic
Graphene Platelets	16%	Not Known

SECTION 3: Hazards Identification – Emergency Overview

Appearance: Dark Gray to Black Liquid

Flash Point: -14.5 deg C

Danger! Highly flammable. Causes eye and respiratory tract irritation. May form explosive peroxides. Hygroscopic.

Target Organs: Kidneys, central nervous system, liver, respiratory system, eyes, skin.

Eye: Contact with eyes may cause severe irritation and possible burns. Vapors may cause irritation. Damage may be permanent.

Skin: Causes skin irritation. May be absorbed through the skin. If absorbed, causes symptoms similar to inhalation. Tetrahydrofuran is not a skin sensitizer in animals.

SECTION 3: Hazards Identification – Emergency Overview Continued

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression.

Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness, and coma. Vapors may cause dizziness or suffocation. Inhalation may cause coughing, difficulty breathing and loss of consciousness. Causes irritation of the mucous membrane and upper respiratory tract. Inhalation of tetrahydrofuran vapors may cause abnormal liver function as detected by laboratory tests.

Chronic: Prolonged or repeated eye contact may cause conjunctivitis. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause liver and kidney damage. May cause lung damage. Narcotic in high concentrations. Data show carcinogenic activity in the liver and kidneys of laboratory animals. The kidney tumors were by a mechanism that has no relevance in humans.

SECTION 4: First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively. Persons with skin problems of liver, kidney, lung, or blood diseases may be at increased risk from exposure to this substance.

SECTION 5: Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire exposed containers cool. Forms peroxides of unknown stability. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Extinguishing Media: Water may be ineffective. In case of fire, use carbon dioxide, dry chemical powder, or appropriate foam.

Flash Point: -14.5 deg C

Autoignition Temperature: 321 deg C

Explosion Limits: Lower 2.0 vol%, Upper 11.8 vol %

NFPA Rating: (*estimated*) Health: 2; Flammability: 3; Instability: 1

SECTION 6: Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in a suitable container. Use water spray to dilute spill to a non-flammable mixture. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Use spark-proof tools. Isolate area and deny entry. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

SECTION 7: Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Empty containers retain product residue, (liquid/vapor), can be dangerous. Take precautionary measures against static discharges. Keep containers tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, sparks or flame. Avoid breathing vapor of mist. Do not get into eyes. Avoid contact with skin and clothing.

SECTION 7: Handling and Storage Continued

Storage: Keep away from heat, sparks, and flame. Store in a cool place in the original container and protect from sunlight. Keep under a nitrogen blanket. Keep from contact with oxidizing materials. Flammables-area. Store protected from moisture. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

SECTION 8: Exposure Controls, Personal Protection

Engineering Controls: Use explosion proof ventilation equipment. Facilities storing of utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits:

Chemical Name	ACGIH	NIOSH	OSHA – Final PELs
Tetrahydrofuran	50 ppm TWA; 100 ppm STEL; Skin – potential significant contribution to overall exposure by the cutaneous route	200 ppm TWA; 590 mg/m3 TWA 2000 ppm IDLH	200 ppm TWA; 590 mg/m3 TWA

OSHA Vacated PELs: Tetrahydrofuran: 200 ppm TWA; 590 mg/m3 TWA

Personal Protective Equipment-

Eyes: Wear appropriate protective eyewear or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN 166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

SECTION 8: Exposure Controls, Personal Protection Continued

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

SECTION 9: Physical and Chemical Properties

Physical State: Liquid

Appearance: Gray to Black in color

Odor: Ether- like

pH: ~ 7 (in ag soin)

Vapor Pressure: ~ 145mm Hg @ 20 deg C

Vapor Density: ~ 2.5 (Air = 1)

Evaporation Rate: > 1 (Butyl Acetate =1)

Decomposition Temperature: not available

Solubility: Soluble

SECTION 10: Stability and Reactivity

Chemical Stability: Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. This material is most hazardous when peroxide levels are concentrated by distillation or evaporation. Tetrahydrofuran should never be distilled to dryness.

Conditions to avoid: Light, ignition sources. Moisture, excessive heat, evaporating to near dryness, confined spaces.

Incompatibilities with other Materials: Strong oxidizing agents, strong acids, oxygen, bromine, metal halides, lithium tetrahydro aluminate, borane, sodium aluminum hydride, sodium tetrahydro aluminate, caustic alkalis.

SECTION 10: Stability and Reactivity Continued

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: May occur.

SECTION 11: Toxicological Information

RTECS#:

CAS# 109-99-9 LU5950000

LD50/LC50:

CAS# 109-99-9:

Inhalation, rat: LC50 = 21000 ppm/3H;

Oral, rat: LD50 = 1650mg/kg;

Carcinogenicity:

CAS# 109-99-9:

ACGIH: A3- Confirmed animal carcinogen with unknown relevance to humans.

California: Not listed.

NTP: Not listed.

IARC: No Graphene component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen. Tetrahydrofuran component of this product is not listed.

Epidemiology: No information found.

Teratogenicity: Animal data show developmental effects only at exposure levels producing other toxic effects in the adult animal.

Reproductive effects: Animal testing for reproductive effects shows no change in reproductive performance.

SECTION 11: Toxicological Information Continued

Mutagenicity: Tetrahydrofuran component of this product has not produced genetic damage in mammalian cell cultures or in animals. It has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals, however not been tested for heritable genetic damage.

Neurotoxicity: No information found.

SECTION 12: Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 2160mg/L; 96Hr; Flow through bioassay (pH 7.5) Water flea Daphnia: EC50 = 5930mg/L; 24Hr; The tetrahydrofuran component of this product is not expected to absorb to suspended matter in the water based on its measured Koc values. This compound should volatilize from water surfaces. An estimated BCF value of 1 suggests that tetrahydrofuran will not bioconcentrate in aquatic organisms.

Environmental: If released to the atmosphere, tetrahydrofuran will exist solely in the vapor phase and is degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals and nitrate radicals with half-lives of about 1 and 3 days, respectively. Measured Koc values of 23 and 18 indicate that the tetrahydrofuran component of this product will have very high mobility in soil.

SECTION 13: Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P- Series: None listed.

RCRA U- Series: CAS# 109-99-9: waste number U213 (Ignitable waste).

SECTION 14: Transport Information

	US DOT	Canada TDG
Shipping Name:	Tetrahydrofuran	Tetrahydrofuran
Hazard Class:	3	3
UN Number:	UN2056	UN2056
Packing Group:	11	11
Additional Information:		Flashpoint -21C

SECTION 15: Regulatory Information

US FEDERAL

TSCA: CAS# 109-99-9 is listed on the TSCA inventory.

Health and Safety Reporting List: None of the ingredients of this product appear on the list.

Chemical Test Rules: CAS# 109-99-9: 40 CFR 799.5000; 40 CFR 799.5115.

Section 12b: CAS# 109-99-9: Section 4, 1% de minimus concentration.

TSCA Significant New Use Rule: None of the ingredients of this product have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs: CAS# 109-99-9: 1000 lb final RQ; 454 kg final RQ.

SARA Section 302 Extremely Hazardous Substances: None of the ingredients in this product have a TPQ .

SARA Codes: CAS# 109-99-9: immediate, fire, reactive.

Section 313: No chemicals are reported under this section.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

SECTION 15: Regulatory Information Continued

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

STATE: CAS# 109-99-9 can be found on the following state right to know lists; California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

SECTION 16: Additional Information

MSDS Release Date: 03/13/2023

Revision: A

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