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SAFETY DATA SHEET

DDP SPECIALTY ELECTRONIC MATERIALS US 9, LLC

Product name: MOLYKOTE® 557 Silicone Dry Film Lubricant Spray

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DDP SPECIALTY ELECTRONIC MATERIALS US 9, LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: MOLYKOTE® 557 Silicone Dry Film Lubricant Spray

Recommended use of the chemical and restrictions on use
Identified uses: Lubricants and lubricant additives

COMPANY IDENTIFICATION
DDP SPECIALTY ELECTRONIC MATERIALS
US 9, LLC
974 Centre Road
Wilmington DE 19805
UNITED STATES

Customer Information Number: 833-338-7668
SDSQuestion-NA@dupont.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: +1 800-424-9300
Local Emergency Contact: +1 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
GHS classification in accordance with 29 CFR 1910.1200
Aerosols - Category 1
Skin irritation - Category 2
Eye irritation - Category 2A
Specific target organ toxicity - single exposure - Category 3

Label elements
Hazard pictograms

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Signal word: **DANGER!**

Hazards
Extremely flammable aerosol.
Pressurised container: May burst if heated.
Causes skin irritation.
Causes serious eye irritation.
May cause drowsiness or dizziness.

Precautionary statements

Prevention
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Do not spray on an open flame or other ignition source.
Do not pierce or burn, even after use.
Avoid breathing mist.
Avoid breathing spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ eye protection/ face protection.

Response
IF ON SKIN: Wash with plenty of water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If skin irritation occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/ attention.

Storage
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Disposal
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
No data available
Further information

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The values listed below represent the percentages of ingredients of unknown toxicity.
The following percentage of the mixture consists of ingredient(s) with unknown acute oral toxicity: 25.7 %
The following percentage of the mixture consists of ingredient(s) with unknown acute dermal toxicity: 29.48 %
The following percentage of the mixture consists of ingredient(s) with unknown acute inhalation toxicity: 3.78 %

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Hydrocarbon aerosol propellant
This product is a mixture.

Component	CASRN	Concentration
Acetone	67-64-1	>= 30.0 - <= 60.0 %
Naphtha, Petroleum, Light Alkylate	64741-66-8	>= 10.0 - <= 30.0 %
Propane	74-98-6	>= 10.0 - <= 30.0 %
Butane (containing < 0.1% butadiene)	106-97-8	>= 7.0 - <= 13.0 %
Isopropanol	67-63-0	>= 3.0 - <= 7.0 %

4. FIRST AID MEASURES

Description of first aid measures
General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: If inhaled Move person to fresh air; if effects occur, consult a physician.

Skin contact: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Contaminated work clothing should not be allowed out of the workplace. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands. In the case of skin irritation or allergic reactions see a physician. Suitable emergency safety shower facility should be available in work area.

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Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be available in work area.

Ingestion: Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Seek medical attention immediately. Consult a physician if necessary.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical

Unsuitable extinguishing media: Do not use direct water stream.

Special hazards arising from the substance or mixture
Hazardous combustion products: Carbon oxides Silicon oxides Formaldehyde

Unusual Fire and Explosion Hazards: Flash back possible over considerable distance. May form explosive mixtures in air. Exposure to combustion products may be a hazard to health. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure. Vapours may form explosive mixtures with air.

Advice for firefighters
Fire Fighting Procedures: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. EXPLOSION HAZARD. Fight advanced fires from a protected location. Do not use a solid water stream as it may scatter and spread fire.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

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Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Remove all sources of ignition. Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: Do not release the product to the aquatic environment above defined regulatory levels Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapours/mists with a water spray jet. Clean up remaining materials from spill with suitable absorbant. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.
See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling: Do not get on skin or clothing. Do not breathe vapours or spray mist. Do not swallow. Do not get in eyes. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment. Close valve after each use and when empty. Do NOT change or force fit connections. Open the valves slowly to prevent pressure surges. Handle in accordance with good industrial hygiene and safety practice. Do not spray on an open flame or other ignition source. Use with local exhaust ventilation. Use only in an area equipped with explosion proof exhaust ventilation. See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Advice on general occupational hygiene
Handle in accordance with good industrial hygiene and safety practice. Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating. Ensure that eye flushing systems and safety showers are located close to the working place.

Conditions for safe storage: Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Keep away from direct sunlight. Store in accordance with the particular national regulations. Do not pierce or burn, even after use. Keep cool. Protect from sunlight.

Do not store with the following product types: Self-reactive substances and mixtures. Organic peroxides. Flammable solids. Pyrophoric liquids. Pyrophoric solids. Self-heating substances and

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mixtures. Substances and mixtures, which in contact with water, emit flammable gases. Explosives. Oxidizing agents.
Unsuitable materials for containers**:** None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value
Acetone	DUPONT AEL	AEL *	200 ppm
	DUPONT AEL	STEL	300 ppm
	ACGIH	TWA	250 ppm
	Further information: A4: Not classifiable as a human carcinogen		
	ACGIH	STEL	500 ppm
	Further information: A4: Not classifiable as a human carcinogen		
	OSHA Z-1	TWA	2,400 mg/m3 1,000 ppm
	CAL PEL	STEL	1,780 mg/m3 750 ppm
	CAL PEL	C	3,000 ppm
	CAL PEL	PEL	1,200 mg/m3 500 ppm
	OSHA P0	STEL	2,400 mg/m3 1,000 ppm
	OSHA P0	TWA	1,800 mg/m3 750 ppm
	NIOSH REL	TWA	590 mg/m3 250 ppm
Naphtha, Petroleum, Light Alkylate	DUPONT AEL	AEL *	50 ppm
	DUPONT AEL	STEL	150 ppm
	OSHA Z-1	TWA	2,000 mg/m3 500 ppm
	OSHA P0	TWA	1,600 mg/m3 400 ppm
Propane	ACGIH		See Further information
	Further information: See Appendix F: Minimal Oxygen Content; EX: Explosion hazard: the substance is a flammable asphyxiant or excursions above the TLV® could approach 10% of the lower explosive limit.; asphyxia: Asphyxia; D: Simple asphyxiant; see discussion covering Minimal Oxygen Content found in the 'Definitions and Notations' section following the NIC tables		
	OSHA Z-1	TWA	1,800 mg/m3 1,000 ppm
	CAL PEL	PEL	1,800 mg/m3 1,000 ppm
	Further information: (h): A number of gases and vapors, when present in high concentrations, act primarily as asphyxiants without other adverse effects. A concentration limit is not included for each material because the limiting factor is the available oxygen. (Several of these materials present fire or explosion hazards.)		
	NIOSH REL	TWA	1,800 mg/m3 1,000 ppm
Butane (containing < 0.1% butadiene)	ACGIH	STEL	1,000 ppm

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	NIOSH REL	TWA	1,900 mg/m3	800 ppm
Isopropanol	DUPONT AEL	AEL *		200 ppm
	ACGIH	TWA		200 ppm
	Further information: A4: Not classifiable as a human carcinogen			
	ACGIH	STEL		400 ppm
	Further information: A4: Not classifiable as a human carcinogen			
	OSHA Z-1	TWA	980 mg/m3	400 ppm
	CAL PEL	PEL	980 mg/m3	400 ppm
	CAL PEL	STEL	1,225 mg/m3	500 ppm
	OSHA P0	TWA	980 mg/m3	400 ppm
	OSHA P0	STEL	1,225 mg/m3	500 ppm
	NIOSH REL	ST	1,225 mg/m3	500 ppm
	NIOSH REL	TWA	980 mg/m3	400 ppm

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Acetone	67-64-1	Acetone	Urine	End of shift (As soon as possible after exposure ceases)	25 mg/l	ACGIH BEI
Isopropanol	67-63-0	Acetone	Urine	End of shift at end of workweek	40 mg/l	ACGIH BEI

Exposure controls

Engineering measures: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only in enclosed systems or with local exhaust ventilation. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and people working at this point. Lethal concentrations may exist in areas with poor ventilation.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating. Ensure that eye flushing systems and safety showers are located close to the working place.

Individual protection measures

Eye/face protection: Wear eye/face protection. Chemical goggles and face shield. If exposure causes eye discomfort, use a full-face respirator.

Skin protection

Hand protection: Use gloves chemically resistant to this material. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be

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handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.
Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. When respiratory protection is required, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Aerosol containing a dissolved gas
Color	colourless
Odor	solvent-like
Odor Threshold	No data available
pH	Substance/mixture is non-soluble (in water).
Melting point/ range	No data available
Freezing point	No data available
Boiling point (760 mmHg)	Not applicable
Flash point	Not applicable
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Flammability (solid, gas)	Extremely flammable aerosol.
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor Pressure	No data available
Relative Vapor Density (air = 1)	No data available
Relative Density (water = 1)	0.8
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Dynamic Viscosity	Not applicable
Kinematic Viscosity	Not applicable

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Explosive properties	Not explosive
Oxidizing properties	The substance or mixture is not classified as oxidizing.
Molecular weight	No data available
Particle size	Not applicable

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure. Vapours may form explosive mixture with air. Extremely flammable aerosol.

Conditions to avoid: Heat, flames and sparks.

Incompatible materials: Oxidizing agents

Hazardous decomposition products: Formaldehyde.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity
Product test data not available. Refer to component data.

Acute dermal toxicity
Product test data not available. Refer to component data.

Acute inhalation toxicity
Product test data not available. Refer to component data.

Skin corrosion/irritation
Product test data not available. Refer to component data.

Serious eye damage/eye irritation

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Product test data not available. Refer to component data.

Sensitization
Product test data not available. Refer to component data.

Specific Target Organ Systemic Toxicity (Single Exposure)
Product test data not available. Refer to component data.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Product test data not available. Refer to component data.

Carcinogenicity
Product test data not available. Refer to component data.

Teratogenicity
Product test data not available. Refer to component data.

Reproductive toxicity
Product test data not available. Refer to component data.

Mutagenicity
Product test data not available. Refer to component data.

Aspiration Hazard
Product test data not available. Refer to component data.

COMPONENTS INFLUENCING TOXICOLOGY:

Acetone

Acute oral toxicity
Central nervous system effects. LD50, Rat, 5,800 mg/kg

Acute dermal toxicity
LD50, Rabbit, > 7,426 mg/kg

Acute inhalation toxicity
Central nervous system effects. LC50, Rat, 4 Hour, vapour, 76 mg/l

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.

Sensitization
Did not cause allergic skin reactions when tested in guinea pigs.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Target Organs: Central nervous system

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Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Carcinogenicity
Animal testing did not show any carcinogenic effects.

Teratogenicity
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive toxicity
In animal studies, did not interfere with reproduction.

Mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Aspiration Hazard
The substance or mixture causes concern owing to the assumption that it causes a human aspiration toxicity hazard.

Naphtha, Petroleum, Light Alkylate

Acute oral toxicity
Central nervous system effects. Information given is based on data obtained from similar substances. LD50, Rat, > 5,000 mg/kg OECD Test Guideline 401

Acute dermal toxicity
Information given is based on data obtained from similar substances. LD50, Rabbit, > 2,000 mg/kg OECD Test Guideline 402

Acute inhalation toxicity
An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration. Information given is based on data obtained from similar substances. LC50, Rat, 4 Hour, vapour, > 5.610 mg/l OECD Test Guideline 403

Skin corrosion/irritation
Brief contact may cause moderate skin irritation with local redness.
Information given is based on data obtained from similar substances.

Serious eye damage/eye irritation
May cause slight temporary eye irritation.
Information given is based on data obtained from similar substances.

Sensitization
Did not cause allergic skin reactions when tested in guinea pigs.
Information given is based on data obtained from similar substances.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Target Organs: Central nervous system

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Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.
Information given is based on data obtained from similar substances.

Carcinogenicity
Animal testing did not show any carcinogenic effects. For similar material(s):

Teratogenicity
Did not cause birth defects or any other fetal effects in laboratory animals. Information given is based on data obtained from similar substances.

Reproductive toxicity
In animal studies, did not interfere with reproduction. Information given is based on data obtained from similar substances.

Mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.
Information given is based on data obtained from similar substances.

Aspiration Hazard
The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Propane

Acute oral toxicity
Single dose oral LD50 has not been determined.

Acute dermal toxicity
The dermal LD50 has not been determined.

Acute inhalation toxicity
LC50, Rat, 4 Hour, gas, > 200000 ppm

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Sensitization
For skin sensitization:
No data available

For respiratory sensitization:
No data available

Specific Target Organ Systemic Toxicity (Single Exposure)
Available data are inadequate to determine single exposure specific target organ toxicity.

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Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Carcinogenicity
No data available

Teratogenicity
Did not cause birth defects or any other fetal effects in laboratory animals.

Reproductive toxicity
In animal studies, did not interfere with reproduction.

Mutagenicity
In vitro genetic toxicity studies were negative.

Aspiration Hazard
No aspiration toxicity classification

Butane (containing < 0.1% butadiene)

Acute oral toxicity
Single dose oral LD50 has not been determined.

Acute dermal toxicity
The dermal LD50 has not been determined.

Acute inhalation toxicity
For similar material(s): LC50, Mouse, 4 Hour, gas, 346933 ppm

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Teratogenicity
Did not cause birth defects or any other fetal effects in laboratory animals. Information given is based on data obtained from similar substances.

Reproductive toxicity
In animal studies, did not interfere with reproduction.

Mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative. Information given is based on data obtained from similar substances.

Aspiration Hazard
No aspiration toxicity classification

Isopropanol

Acute oral toxicity

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LD50, Rat, 5,840 mg/kg OECD Test Guideline 401

Acute dermal toxicity
LD50, Rabbit, 16,400 mg/kg OECD Test Guideline 402

Acute inhalation toxicity
Central nervous system. LC50, Rat, 6 Hour, vapour, > 10,000 mg/l OECD Test Guideline 403

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.

Sensitization
Did not cause allergic skin reactions when tested in guinea pigs.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Target Organs: Central nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Carcinogenicity
Animal testing did not show any carcinogenic effects.

Teratogenicity
Did not cause birth defects in laboratory animals.

Reproductive toxicity
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Aspiration Hazard
The substance or mixture causes concern owing to the assumption that it causes a human aspiration toxicity hazard.

Carcinogenicity

Component	List	Classification
Naphtha, Petroleum, Light Alkylate	IARC	Group 2B: Possibly carcinogenic to humans

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12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

Acetone

Acute toxicity to fish
LC50, Pimephales promelas (fathead minnow), 96 Hour, 6,210 - 8,120 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
LC50, Daphnia pulex (Water flea), 48 Hour, 8,800 mg/l

Acute toxicity to algae/aquatic plants
NOEC, Microcystis aeruginosa (blue-green algae), 8 d, 530 mg/l

Toxicity to bacteria
IC50, activated sludge, 3 Hour, > 1,000 mg/l, OECD 209 Test

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 28 d, 2,212 mg/l

Toxicity to Above Ground Organisms
Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).
dietary LC50, Coturnix japonica (Japanese quail), > 20,000 ppm

Naphtha, Petroleum, Light Alkylate

Acute toxicity to fish
LL50, Pimephales promelas (fathead minnow), 96 Hour, 8.2 mg/l

Acute toxicity to aquatic invertebrates
Information given is based on data obtained from similar substances.
EL50, Daphnia magna (Water flea), 48 Hour, 4.5 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
Information given is based on data obtained from similar substances.
EL50, Raphidocelis subcapitata (freshwater green alga), 72 Hour, 3.1 mg/l, OECD Test Guideline 201
Information given is based on data obtained from similar substances.
NOELR, Raphidocelis subcapitata (freshwater green alga), 72 Hour, 0.5 mg/l, OECD Test Guideline 201

Chronic toxicity to fish
Information given is based on data obtained from similar product.
NOELR, Pimephales promelas (fathead minnow), 14 d, 2.6 mg/l

Chronic toxicity to aquatic invertebrates

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NOELR, Daphnia magna (Water flea), 21 d, 2.6 mg/l

Propane

Acute toxicity to fish
No data available

Acute toxicity to aquatic invertebrates
No data available

Acute toxicity to algae/aquatic plants
No data available

Isopropanol

Acute toxicity to fish
LC50, Pimephales promelas (fathead minnow), 96 Hour, 10,000 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
No data available

Acute toxicity to algae/aquatic plants
No data available

Toxicity to bacteria
EC50, activated sludge, > 1,000 mg/l

Chronic toxicity to fish
NOEC, Danio rerio (zebra fish), 28 d, > 1,000 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 21 d, > 1,000 mg/l

Persistence and degradability

Acetone

Biodegradability: Readily biodegradable.

Biodegradation: 90.9 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Theoretical Oxygen Demand: 2.20 mg/mg Estimated.

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	69.10%
10 d	72.70%
20 d	73.6 %

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Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 52 d
Method: Estimated.

Naphtha, Petroleum, Light Alkylate
Biodegradability: Not applicable

Propane
Biodegradability: No data available

Theoretical Oxygen Demand: 3.64 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 8.4 d
Method: Estimated.

Butane (containing < 0.1% butadiene)
Biodegradability: Readily biodegradable.
Biodegradation: 100 %
Exposure time: 17 d

Theoretical Oxygen Demand: 3.58 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 49 Hour
Method: Estimated.

Isopropanol
Biodegradability: Readily biodegradable.
Biodegradation: 53 %
Exposure time: 5 d

Theoretical Oxygen Demand: 2.40 mg/mg Estimated.

Chemical Oxygen Demand: 2.09 mg/mg Estimated.

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	20 - 72 %
20 d	78 - 86 %

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Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 1.472 d
Method: Estimated.

Bioaccumulative potential

Acetone
Bioaccumulation: Bioaccumulation is unlikely.
Partition coefficient: n-octanol/water(log Pow): -0.24 at 20 °C

Naphtha, Petroleum, Light Alkylate
Bioaccumulation: Not applicable
Partition coefficient: n-octanol/water(log Pow): 1.99 - 5.25 at 20 °C

Propane
Bioaccumulation: Bioaccumulation is unlikely.
Partition coefficient: n-octanol/water(log Pow): 1.815

Butane (containing < 0.1% butadiene)
Bioaccumulation: Bioaccumulation is unlikely.
Partition coefficient: n-octanol/water(log Pow): 2.31 at 20 °C

Isopropanol
Bioaccumulation: Bioaccumulation is unlikely.
Partition coefficient: n-octanol/water(log Pow): ca.0.05 at 25 °C
Bioconcentration factor (BCF): 1.02 estimated

Mobility in soil

Acetone
Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 0.37 - 2.0 Estimated.

Naphtha, Petroleum, Light Alkylate
No data available

Butane (containing < 0.1% butadiene)
No data available

Isopropanol
Substance is very mobile in soil (Log Koc < 2).
estimated

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13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. For additional information, refer to: Handling & Storage Information, MSDS Section 7 Stability & Reactivity Information, MSDS Section 10 Regulatory Information, MSDS Section 15

Treatment and disposal methods of used packaging: Empty containers should be recycled or otherwise disposed of by an approved waste management facility. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. Do not re-use containers for any purpose.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Aerosols
UN number	UN 1950
Class	2.1
Packing group	
Reportable Quantity	Acetone

Classification for SEA transport (IMO-IMDG):

Proper shipping name	AEROSOLS
UN number	UN 1950
Class	2.1
Packing group	
Marine pollutant	No
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	Aerosols, flammable
UN number	UN 1950
Class	2.1
Packing group	

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This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
The following components are subject to reporting levels established by SARA Title III, Section 313:

Components	CASRN	Concentration %
Isopropanol	67-63-0	>= 1.0 - < 5.0 %

Pennsylvania Right To Know
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	CASRN
Acetone	67-64-1
Naphtha, Petroleum, Light Alkylate	64741-66-8
Propane	74-98-6
Butane (containing < 0.1% butadiene)	106-97-8
Isopropanol	67-63-0
Trimethylstearyloxysilane	18748-98-6

California Prop. 65
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the Active inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

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Hazard Rating System
NFPA

Health	Flammability	Instability
2	4	0

HMIS

Health	Flammability	Physical Hazard
2/	4	3

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Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
AEL *	12 hr. TWA
C	Ceiling
CAL PEL	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
DUPONT AEL	DuPont AEL (Acceptable Exposure Limit)
NIOSH REL	USA. NIOSH Recommended Exposure Limits
OSHA P0	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
PEL	Permissible exposure limit
ST	STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
STEL	Short-term exposure limit
TWA	8-hour time weighted average

Full text of other abbreviations
AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population

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(Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

DDP SPECIALTY ELECTRONIC MATERIALS US 9, LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.
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