



SAFETY DATA SHEET

DDP Specialty Electronic Materials US,
LLC

Product name: BETASEAL™ 43555 Primer

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DDP Specialty Electronic Materials US, 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: BETASEAL™ 43555 Primer

Recommended use of the chemical and restrictions on use

Identified uses: A primer - Bonding agent For use in automotive applications.

COMPANY IDENTIFICATION

DDP Specialty Electronic Materials US,
LLC

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 1-800-424-9300

Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification

GHS classification in accordance with 29 CFR 1910.1200

Flammable liquids - Category 2

Skin irritation - Category 2

Eye irritation - Category 2A

Reproductive toxicity - Category 2

Specific target organ toxicity - single exposure - Category 3

Specific target organ toxicity - repeated exposure - Category 2 - Inhalation

Aspiration hazard - Category 1

Label elements

Hazard pictograms



Signal word: **DANGER!**

Hazards

Highly flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
Causes serious eye irritation.
May cause drowsiness or dizziness.
Suspected of damaging fertility or the unborn child.
May cause damage to organs (Nervous system) through prolonged or repeated exposure if inhaled.

Precautionary statements

Prevention

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
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 exposed or concerned: Get medical advice/ attention.
Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage

Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

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

Other hazards

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Methyl ethyl ketone	78-93-3	> 65.0 - < 75.0 %
Toluene	108-88-3	> 10.0 - < 19.0 %
2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate	9010-88-2	> 10.0 - < 20.0 %
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	25086-48-0	< 10.0 %
3-(Trimethoxysilyl)-1-propylamine	13822-56-5	< 5.0 %
Methyl methacrylate	80-62-6	< 0.5 %

4. FIRST AID MEASURES

Description of first aid measures

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

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.

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.

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

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: Maintain adequate ventilation and oxygenation of the patient. 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 fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire.

Special hazards arising from the substance or mixture

Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Container may vent and/or rupture due to fire. Electrically ground and bond all equipment. Flammable mixtures of this product are readily ignited even by static discharge. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. For large spills, warn public of downwind explosion hazard. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Refer to section 7, Handling, for additional precautionary measures. Use appropriate

safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Absorb with materials such as: Cat litter. Sand. Sawdust. Ground and bond all containers and handling equipment. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Keep away from heat, sparks and flame. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Do not swallow. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use only with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Ignition sources can include and are not limited to pilot lights, flames, smoking, sparks, heaters, electrical equipment, and static discharges. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Never use air pressure for transferring product unless a risk assessment has been conducted that includes consideration of the flammability of the product. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Minimize sources of ignition, such as static build-up, heat, spark or flame. Keep container closed. Flammable mixtures may exist within the vapor space of containers at room temperature. Store in a dry place. Avoid moisture.

Storage stability

Storage temperature:

> 5 - < 35 °C (> 41 - < 95 °F)

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
Methyl ethyl ketone	Dow IHG	TWA	50 ppm
	Dow IHG	STEL	100 ppm
	ACGIH	TWA	200 ppm
	Further information: CNS impair: Central Nervous System impairment; URT irr: Upper Respiratory Tract irritation; PNS impair: Peripheral Nervous System impairment; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section)		
	ACGIH	STEL	300 ppm
	Further information: CNS impair: Central Nervous System impairment; URT irr: Upper		

	Respiratory Tract irritation; PNS impair: Peripheral Nervous System impairment; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section)		
	OSHA Z-1	TWA	590 mg/m3 200 ppm
	Further information: (b): The value in mg/m3 is approximate.		
	CAL PEL	PEL	590 mg/m3 200 ppm
	CAL PEL	STEL	885 mg/m3 300 ppm
Toluene	ACGIH	TWA	20 ppm
	Further information: visual impair: Visual impairment; female repro: Female reproductive; pregnancy loss: Pregnancy loss; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section); A4: Not classifiable as a human carcinogen		
	OSHA Z-1		See Further information
	Further information: (2): See Table Z-2		
	OSHA Z-2	TWA	200 ppm
	Further information: Z37.12-1967		
	OSHA Z-2	CEIL	300 ppm
	Further information: Z37.12-1967		
	OSHA Z-2	Peak	500 ppm
	Further information: Z37.12-1967		
	CAL PEL	PEL	37 mg/m3 10 ppm
	Further information: S: Skin		
	CAL PEL	C	500 ppm
	Further information: S: Skin		
	CAL PEL	STEL	560 mg/m3 150 ppm
	Further information: S: Skin		
Methyl methacrylate	ACGIH	TWA	50 ppm
	Further information: DSEN: Dermal Sensitization; URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation; pulm edema: Pulmonary edema; body weight eff: body weight effects; A4: Not classifiable as a human carcinogen		
	ACGIH	STEL	100 ppm
	Further information: DSEN: Dermal Sensitization; URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation; pulm edema: Pulmonary edema; body weight eff: body weight effects; A4: Not classifiable as a human carcinogen		
	ACGIH	STEL	100 ppm
	Further information: DSEN: Dermal Sensitization; URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation; pulm edema: Pulmonary edema; body weight eff: body weight effects; A4: Not classifiable as a human carcinogen		
	OSHA Z-1	TWA	410 mg/m3 100 ppm
	Further information: (b): The value in mg/m3 is approximate.		
	CAL PEL	PEL	205 mg/m3 50 ppm
	CAL PEL	STEL	410 mg/m3 100 ppm
	NIOSH REL	TWA	410 mg/m3 100 ppm

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Methyl ethyl ketone	78-93-3	methyl ethyl ketone	Urine	End of shift (As soon as possible after exposure ceases)	2 mg/l	ACGIH BEI
Toluene	108-88-3	Toluene	In blood	Prior to last shift of	0.02 mg/l	ACGIH BEI

Toluene	Urine	workweek End of shift (As soon as possible after exposure ceases)	0.03 mg/l	ACGIH BEI
o-Cresol	Urine	End of shift (As soon as possible after exposure ceases)	0.3 mg/g Creatinine	ACGIH BEI

Exposure controls

Engineering controls: 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 with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Hygiene measures: 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: Use chemical goggles.

Skin protection

Hand protection: Use gloves chemically resistant to this material.

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. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	Liquid.
Color	Yellow
Odor	Solvent
Odor Threshold	No test data available
pH	No test data available
Melting point/range	No test data available
Freezing point	No test data available
Boiling point (760 mmHg)	No test data available

Flash point	closed cup -4 °C (25 °F) <i>Setaflash Closed Cup ASTM D3828</i>
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	Flammable liquid
Lower explosion limit	No test data available
Upper explosion limit	No test data available
Vapor Pressure	No test data available
Relative Vapor Density (air = 1)	No test data available
Relative Density (water = 1)	0.87 <i>ASTM D1475</i>
Water solubility	Not applicable
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No test data available
Decomposition temperature	No test data available
Dynamic Viscosity	No test data available
Kinematic Viscosity	No test data available
Explosive properties	No test data available
Oxidizing properties	No test data available
Molecular weight	No data available
Volatile Organic Compounds	5.9 lb/gln <i>EPA Method No. 24</i> (typical value)

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

10. STABILITY AND REACTIVITY

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical stability: Stable under recommended storage conditions. See Storage, Section 7.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Avoid static discharge.

Incompatible materials: Avoid contact with: Acids. Bases. Oxidizers.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials.

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

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:**Methyl ethyl ketone****Acute oral toxicity**

LD50, Rat, 2,193 mg/kg

Acute dermal toxicity

LD50, Rabbit, > 8,049 mg/kg

Acute inhalation toxicity

LC50, Mouse, 4 Hour, vapour, 32 mg/l

Skin corrosion/irritation

Brief contact is essentially nonirritating to skin.
Prolonged contact may cause moderate skin irritation with local redness.
Repeated contact may cause moderate skin irritation with local redness.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation

May cause pain disproportionate to the level of irritation to eye tissues.
May cause moderate eye irritation which may be slow to heal.
May cause moderate corneal injury.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Sensitization

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

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Methyl ethyl ketone has caused liver effects in laboratory animals exposed by inhalation to high concentrations.
Methyl ethyl ketone is probably not neurotoxic in itself but it potentiates the neurotoxicity of methyl-n-butyl ketone and n-hexane.

Carcinogenicity

Available data are inadequate to evaluate carcinogenicity.

Teratogenicity

Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive toxicity

For similar material(s): In animal studies, did not interfere with reproduction.

Mutagenicity

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

Aspiration Hazard

May be harmful if swallowed and enters airways.

Toluene**Acute oral toxicity**

LD50, Rat, 5,580 mg/kg

Acute dermal toxicity

LD50, Rabbit, 12,267 mg/kg

Acute inhalation toxicity

Symptoms may include headache, dizziness and drowsiness, progressing to incoordination and unconsciousness. Alcohol consumption and exertion may increase the adverse effects of toluene. LC50, Rat, male, 4 Hour, vapour, 25.7 mg/l

LC50, Rat, female, 4 Hour, vapour, 30 mg/l

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness.
Prolonged contact may cause moderate skin irritation with local redness.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation

May cause slight eye irritation.
May cause slight temporary corneal injury.
Vapor may cause eye irritation experienced as mild discomfort and redness.
Vapor may cause lacrimation (tears).

Sensitization

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

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Central nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)

In animals, effects have been reported on the following organs:
central nervous system (CNS) effects
Excessive exposure may cause neurologic signs and symptoms.
Toluene has caused hearing loss in laboratory animals upon exposure to high concentrations.
Intentional misuse by deliberately inhaling toluene may cause nervous system damage, hearing loss, liver and kidney effects and death.

Carcinogenicity

Did not cause cancer in laboratory animals.

Teratogenicity

In laboratory animals, toluene has been toxic to the fetus at doses toxic to the mother; it has caused birth defects in mice when administered orally, but not by inhalation.

Reproductive toxicity

In animal studies, did not interfere with reproduction.

Mutagenicity

The majority and most reliable of the many genetic toxicity studies on toluene, both in vitro and in animals, indicate that it is not genetically toxic.

Aspiration Hazard

May be fatal if swallowed and enters airways.

2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate

Acute oral toxicity

Single dose oral LD50 has not been determined.

Acute dermal toxicity

The dermal LD50 has not been determined.

Acute inhalation toxicity

The LC50 has not been determined.

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Sensitization

Did not cause allergic skin reactions when tested in humans.

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

Available data are inadequate to determine single exposure specific target organ toxicity.

Specific Target Organ Systemic Toxicity (Repeated Exposure)

No relevant data found.

Carcinogenicity

No relevant data found.

Teratogenicity

No relevant data found.

Reproductive toxicity

No relevant data found.

Mutagenicity

No relevant data found.

Aspiration Hazard

No aspiration toxicity classification

Acetic acid ethenyl ester, polymer with chloroethene and ethenol**Acute oral toxicity**

Single dose oral LD50 has not been determined.

Acute dermal toxicity

The dermal LD50 has not been determined.

Acute inhalation toxicity

The LC50 has not been determined.

3-(Trimethoxysilyl)-1-propylamine**Acute oral toxicity**

LD50, Rat, male, 3,029 mg/kg OECD 401 or equivalent

Acute dermal toxicity

LD50, Rabbit, male, > 2,000 mg/kg OECD 402 or equivalent

Acute inhalation toxicity

The LC50 has not been determined.

Skin corrosion/irritation

Brief contact may cause moderate skin irritation with local redness.

Serious eye damage/eye irritation

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Sensitization

For skin sensitization:

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

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

Available data are inadequate to determine single exposure specific target organ toxicity.

Specific Target Organ Systemic Toxicity (Repeated Exposure)

For similar material(s):

In animals, effects have been reported on the following organs:

Liver

Carcinogenicity

No relevant data found.

Teratogenicity

For similar material(s): Has caused birth defects in laboratory animals only at doses toxic to the mother.

Reproductive toxicity

For similar material(s): Limited data in laboratory animals suggest that the material does not affect reproduction.

Mutagenicity

In vitro genetic toxicity studies were negative.

Animal genetic toxicity studies were negative.

Aspiration Hazard

Based on available information, aspiration hazard could not be determined.

Methyl methacrylate**Acute oral toxicity**

Swallowing may result in gastrointestinal irritation. LD50, Rat, 7,900 mg/kg

Acute dermal toxicity

LD50, Rabbit, > 5,000 mg/kg

Acute inhalation toxicity

LC50, Rat, 4 Hour, vapour, 29.8 mg/l

Skin corrosion/irritation

Brief contact may cause moderate skin irritation with local redness.

Serious eye damage/eye irritation

May cause slight eye irritation.

Corneal injury is unlikely.

Vapor may cause eye irritation experienced as mild discomfort and redness.

Sensitization

Has caused allergic skin reactions in humans.

Has demonstrated the potential for contact allergy in mice.

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

May cause respiratory irritation.

Route of Exposure: Inhalation

Target Organs: Respiratory Tract

Specific Target Organ Systemic Toxicity (Repeated Exposure)

In humans, effects have been reported on the following organs:

Respiratory tract.

In animals, effects have been reported on the following organs:

kidney

Liver

Gastrointestinal tract

nervous system

lung

Carcinogenicity

Did not cause cancer in laboratory animals. Workers exposed during 1933-1945 to very high vapor concentrations of ethyl acrylate and methyl methacrylate, and to volatile by-products of the ethyl acrylate/methyl methacrylate polymerization process, showed an increase in deaths due to colorectal cancer. Such increases were not observed in workers exposed after that time. Although suggestive, these findings do not establish a causal relationship between high level exposure to these acrylates and colorectal cancer.

Teratogenicity

MMA did not cause birth defects, malformations, or fetal toxicity in pregnant rats inhaling concentrations up to 2028 ppm. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. The weight of evidence indicates that methyl methacrylate does not cause birth defects in animals.

Reproductive toxicity

In animal studies, did not interfere with fertility.

Mutagenicity

In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

Aspiration Hazard

May be harmful if swallowed and enters airways.

12. ECOLOGICAL INFORMATION

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

Toxicity**Methyl ethyl ketone****Acute toxicity to fish**

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 2,993 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 308 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (microalgae), static test, 96 Hour, Growth rate inhibition, 2,029 mg/l, OECD Test Guideline 201
NOEC, Pseudokirchneriella subcapitata (green algae), 96 Hour, 1,240 mg/l, OECD Test Guideline 201

Toxicity to bacteria

EC50, Bacteria, 96 Hour, > 1,000 mg/l, hUCC

Toluene**Acute toxicity to fish**

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, 5.8 mg/l

Acute toxicity to aquatic invertebrates

LC50, water flea Ceriodaphnia dubia, semi-static test, 48 Hour, 3.78 mg/l

Acute toxicity to algae/aquatic plants

EbC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Biomass, 12.5 mg/l, OECD Test Guideline 201

Toxicity to bacteria

IC50, Bacteria, 16 Hour, 29 mg/l

Chronic toxicity to fish

NOEC, Fish, flow-through test, 40 d, growth, 1.4 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Ceriodaphnia dubia (water flea), 7 d, number of offspring, 0.74 mg/l

Toxicity to soil-dwelling organisms

LC50, Eisenia fetida (earthworms), 150 - 280 mg/kg

2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate**Acute toxicity to fish**

No relevant data found.

Acetic acid ethenyl ester, polymer with chloroethene and ethenol**Acute toxicity to fish**

No relevant data found.

3-(Trimethoxysilyl)-1-propylamine**Acute toxicity to fish**

For similar material(s):

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, zebra fish (Brachydanio rerio), 96 Hour, > 100 mg/l

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), 48 Hour, > 100 mg/l

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth rate inhibition, > 100 mg/l

Toxicity to bacteria

EC50, Pseudomonas putida, Static, 5.75 Hour, Respiration rates., 43 mg/l

Methyl methacrylate**Acute toxicity to fish**

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

LC50, Oncorhynchus mykiss (rainbow trout), flow-through test, 96 Hour, > 79 mg/l, OECD Test Guideline 203 or Equivalent

LC50, Lepomis macrochirus (Bluegill sunfish), flow-through test, 96 Hour, 233 mg/l, EPA-660-75-009

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna, flow-through test, 48 Hour, 69 mg/l

Acute toxicity to algae/aquatic plants

EC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate, > 110 mg/l, OECD Test Guideline 201

NOEC, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, 110 mg/l, OECD Test Guideline 201

Toxicity to bacteria

EC50, 14 d, > 100 mg/l

Chronic toxicity to fish

NOEC, Danio rerio (zebra fish), 35 d, 9.4 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), 21 d, number of offspring, 37 mg/l

Persistence and degradability

Methyl ethyl ketone

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Not applicable

Biodegradation: 98 %

Exposure time: 28 d

Method: OECD Test Guideline 301D or Equivalent

Theoretical Oxygen Demand: 2.44 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	71 - 76 %
10 d	71 - 82 %
20 d	71 - 89 %

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitization: OH radicals

Atmospheric half-life: 8 d

Method: Estimated.

Toluene

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Not applicable

Biodegradation: 100 %

Exposure time: 14 d

Method: OECD Test Guideline 301C or Equivalent

Theoretical Oxygen Demand: 3.13 mg/mg Calculated.

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitization: OH radicals

Atmospheric half-life: 2 d

Method: Estimated.

2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate

Biodegradability: No relevant data found.

Acetic acid ethenyl ester, polymer with chloroethene and ethenol

Biodegradability: No relevant data found.

3-(Trimethoxysilyl)-1-propylamine

Biodegradability: Material is inherently biodegradable (reaches > 20% biodegradation in OECD test(s) for inherent biodegradability).

10-day Window: Not applicable

Biodegradation: 67 %

Exposure time: 28 d

Method: OECD Test Guideline 302B or Equivalent

Stability in Water (1/2-life)

, DT50, 4.2 Hour, pH 7

Methyl methacrylate

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

10-day Window: Not applicable

Biodegradation: 94 %

Exposure time: 14 d

Method: OECD Test Guideline 301C or Equivalent

10-day Window: Not applicable

Biodegradation: > 95 %

Exposure time: 28 d

Method: OECD Test Guideline 302B or Equivalent

Theoretical Oxygen Demand: 1.02 mg/mg

Physico-chemical removability

Rapidly hydrolyzed under alkaline conditions.

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitization: OH radicals

Atmospheric half-life: 6.997 d

Method: Estimated.

Bioaccumulative potential

Methyl ethyl ketone

Bioaccumulation: Bioaccumulation is unlikely. Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): 0.3 at 40 °C Measured

Toluene

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): 2.73 Measured

Bioconcentration factor (BCF): 13.2 - 90 Fish Measured

2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate

Bioaccumulation: No relevant data found.

Acetic acid ethenyl ester, polymer with chloroethene and ethenol

Bioaccumulation: No relevant data found.

3-(Trimethoxysilyl)-1-propylamine

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 0.2 Estimated.

Methyl methacrylate

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 1.38 Measured

Mobility in soil

Methyl ethyl ketone

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 3.8 Estimated.

Toluene

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 37 - 178 Estimated.

2-Propenoic acid, 2-methyl-, methyl ester, polymer with ethyl 2-propenoate

No relevant data found.

Acetic acid ethenyl ester, polymer with chloroethene and ethenol

No relevant data found.

3-(Trimethoxysilyl)-1-propylamine

No relevant data found.

Methyl methacrylate

Potential for mobility in soil is high (Koc between 50 and 150).
Partition coefficient (Koc): 87 Estimated.

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.

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	Coating solution
UN number	UN 1139
Class	3
Packing group	II
Reportable Quantity	Toluene, Methyl ethyl ketone

Classification for SEA transport (IMO-IMDG):

Proper shipping name	COATING SOLUTION
UN number	UN 1139
Class	3
Packing group	II
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	Coating solution
UN number	UN 1139
Class	3
Packing group	II

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

Flammable (gases, aerosols, liquids, or solids)
 Skin corrosion or irritation
 Serious eye damage or eye irritation
 Reproductive toxicity
 Specific target organ toxicity (single or repeated exposure)
 Aspiration hazard

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
Toluene	108-88-3

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103

Calculated RQ exceeds reasonably attainable upper limit.

Components	CASRN	RQ (RCRA Code)
Methyl ethyl ketone	78-93-3	5000 lbs RQ
Methyl ethyl ketone	78-93-3	5000 lbs RQ (D035)
Methyl ethyl ketone	78-93-3	100 lbs RQ (F005)
Methyl ethyl ketone	78-93-3	5000 lbs RQ
Methyl ethyl ketone	78-93-3	5000 lbs RQ (D035)
Methyl ethyl ketone	78-93-3	100 lbs RQ (F005)
Toluene	108-88-3	1000 lbs RQ
Toluene	108-88-3	100 lbs RQ (F005)
Toluene	108-88-3	1000 lbs RQ
Toluene	108-88-3	100 lbs RQ (F005)

Pennsylvania Right To Know

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

Components	CASRN
Methyl ethyl ketone	78-93-3
Toluene	108-88-3

California Prop. 65

WARNING: This product can expose you to chemicals including Methyl isobutyl ketone, Benzene, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

United States TSCA Inventory (TSCA)

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

16. OTHER INFORMATION

Hazard Rating System

NFPA

	Health	Flammability	Instability
 	3	3	0

Revision

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Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
C	Ceiling
CAL PEL	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
CEIL	Acceptable ceiling concentration
Dow IHG	Dow Industrial Hygiene Guideline

NIOSH REL	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
OSHA Z-2	USA. Occupational Exposure Limits (OSHA) - Table Z-2
Peak	Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
PEL	Permissible exposure limit
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 Harmonized 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 Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (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 - Organization 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; 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, 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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