



Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

MEGAPOSIT™ SPR™ 220-3.0 POSITIVE PHOTORESIST

Revision Date: 07/02/2013

Supplier ROHM AND HAAS ELECTRONIC MATERIALS LLC
A Subsidiary of The Dow Chemical Company
455 FOREST STREET
MARLBOROUGH, MA 01752 United States

For non-emergency information contact: 215-592-3000

Emergency telephone number
1 800 424 9300

Local emergency telephone number
989-636-4400

®™*Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Cresol novolak resin		25.0 - 35.0 %
Ethyl lactate	97-64-3	25.0 - 35.0 %
Anisole	100-66-3	10.0 - 20.0 %
Diazo Photoactive Compound		1.0 - 10.0 %
2-Methyl Butyl Acetate	624-41-9	1.0 - 10.0 %
n-amyl acetate	628-63-7	1.0 - 10.0 %
Cresol	1319-77-3	< 1.0 %
Organic Siloxane Surfactant		< 1.0 %
Dioxane	123-91-1	< 0.2 %

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance

Form liquid

Colour Red Amber
Odour ester-like

Hazard Summary

CAUTION!

Combustible liquid and vapor. Causes irritation to eyes, nose, and respiratory tract.
Prolonged, repeated contact, inhalation, ingestion, or absorption through the skin, may cause adverse effects to internal organ systems.

Potential Health Effects

Primary Routes of Entry: Inhalation, ingestion, eye and skin contact, absorption.

Eyes: May cause pain, transient irritation and superficial corneal effects.

Skin: Material may cause irritation.

Prolonged or repeated exposure may have the following effects:

central nervous system depression
drowsiness
defatting of skin leading to irritation and dermatitis

Ingestion: Swallowing may have the following effects:

irritation of mouth, throat and digestive tract
Repeated doses may have the following effects:
central nervous system depression
drowsiness

Inhalation: Inhalation may have the following effects:

irritation of nose, throat and respiratory tract
Higher concentrations may have the following effects:
systemic effects similar to those resulting from ingestion

Target Organs: Eye

Respiratory System
Skin
nervous system

Carcinogenicity

Not considered carcinogenic by NTP, IARC, and OSHA

4. FIRST AID MEASURES

Inhalation: Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.

Skin contact: Wash skin with water. Continue washing for at least 15 minutes. Obtain medical attention if blistering occurs or redness persists.

Eye contact: Immediately flush the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.

Ingestion: Wash out mouth with water. Have victim drink 1-3 glasses of water to dilute stomach contents. Induce vomiting if person is conscious. Immediate medical attention is required. Never administer anything by mouth if a victim is losing consciousness, is unconscious or is convulsing.

Notes to physician: Treat symptomatically.

5. FIREFIGHTING MEASURES

Flash point	45 °C (113 °F)
Ignition temperature	ca.400.0 °C (752 °F) Literature Ethyl lactate
Lower explosion limit	0.34 % volLiterature Anisole
Upper explosion limit	6.3 % volLiterature Anisole

Suitable extinguishing media: Use water spray, foam, dry chemical or carbon dioxide. Keep containers and surroundings cool with water spray.

Specific hazards during firefighting: This product may give rise to hazardous vapors in a fire. Vapors can travel a considerable distance to a source of ignition and result in flashback.

Special protective equipment for firefighters: Wear full protective clothing and self-contained breathing apparatus.

Further information: Pressure may build up in closed containers with possible liberation of combustible vapors.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Wear suitable protective clothing.
Wear respiratory protection.
Eliminate all ignition sources.

Environmental precautions

Prevent the material from entering drains or water courses.
Do not discharge directly to a water source.
Advise Authorities if spillage has entered watercourse or sewer or has contaminated soil or vegetation.

Methods for cleaning up

Contain spills immediately with inert materials (e.g., sand, earth).
Transfer into suitable containers for recovery or disposal.
Finally flush area with plenty of water.

7. HANDLING AND STORAGE

Handling

Use local exhaust ventilation. Avoid contact with eyes, skin and clothing. Keep container tightly closed.

Storage

Storage conditions: Store in original container. Keep away from heat and sources of ignition.

Storage area should be: cool dry well ventilated out of direct sunlight

Further information on storage conditions: Keep away from heat, sparks, flame, and other sources of ignition. Practice good personal hygiene to prevent accidental exposure.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit(s)

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value
Ethyl lactate	Rohm and Haas	TWA	5 ppm
Anisole	Rohm and Haas	TWA	5 ppm
Anisole	Rohm and Haas	STEL	10 ppm
2-Methyl Butyl Acetate	Rohm and Haas	TWA	50 ppm
2-Methyl Butyl Acetate	Rohm and Haas	TWA	50 ppm
2-Methyl Butyl Acetate	Rohm and Haas	STEL	100 ppm
2-Methyl Butyl Acetate	Rohm and Haas	STEL	100 ppm
2-Methyl Butyl Acetate	ACGIH	TWA	50 ppm
2-Methyl Butyl Acetate	ACGIH	STEL	100 ppm
n-amyl acetate	Rohm and Haas	TWA	50 ppm
n-amyl acetate	Rohm and Haas	STEL	100 ppm
n-amyl acetate	OSHA P1	TWA	525 mg/m3 100 ppm
n-amyl acetate	OSHA P0	TWA	525 mg/m3 100 ppm
n-amyl acetate	NIOSH REL	TWA	525 mg/m3 100 ppm
Cresol	OSHA P1	TWA	22 mg/m3 5 ppm
Cresol	OSHA P1	TWA	
Cresol	OSHA P0	TWA	22 mg/m3 5 ppm
Cresol	ACGIH	TWA	
Cresol	ACGIH	TWA Inhalable fraction and vapor	20 mg/m3
Cresol	ACGIH	TWA	
Cresol	OSHA P0	TWA	22 mg/m3 5 ppm
Dioxane	Rohm and Haas	TWA	5 ppm
Dioxane	Rohm and Haas	Absorbed via skin	
Dioxane	ACGIH	TWA	20 ppm
Dioxane	ACGIH	TWA	
Dioxane	OSHA P1	TWA	360 mg/m3 100 ppm
Dioxane	OSHA P1	TWA	
Dioxane	OSHA P0	TWA	90 mg/m3 25 ppm
Dioxane	NIOSH REL	C	3.6 mg/m3 1 ppm

Exposure controls

Engineering measures: Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (local exhaust), and control of process conditions.

Individual protection measures

Eye/face protection: Goggles

Skin protection

Hand protection: Butyl rubber gloves. Other chemical resistant gloves may be recommended by your safety professional.

Other protection: Normal work wear.

Respiratory protection: Respiratory protection if there is a risk of exposure to high vapor concentrations. The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	Red Amber
Odour	ester-like
pH	7
Boiling point/boiling range	150 °C (302 °F)
Flash point	45 °C (113 °F)
Evaporation rate	Slower than ether
Lower explosion limit	0.34 % volLiterature Anisole
Upper explosion limit	6.3 % volLiterature Anisole

Component: Ethyl lactate

Vapour pressure 1.7 mmHg at 20 °C (68 °F)

Component: Anisole

Vapour pressure 9.7 mmHg at 42 °C (108 °F)

Component: Dioxane

Vapour pressure 27.0 mmHg at 20 °C (68 °F)

Relative vapour density	Heavier than air.
Relative density	1.07
Water solubility	insoluble
Auto-ignition temperature	ca.400 °C (752 °F) Literature Ethyl lactate
VOC's	710.00 g/L

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

10. STABILITY AND REACTIVITY

Chemical stability	Stable under normal conditions.
Hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	High temperatures Static discharge
Materials to avoid	Oxidizing agents Bases Acids
Hazardous decomposition products	Carbon monoxide, carbon dioxide, phenols, oxides of sulfur, nitrogen oxides (NOx),
polymerisation	Product will not undergo hazardous polymerization.

11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

Component: **Ethyl lactate**

Acute oral toxicity LD50 rat > 2,000 mg/kg OECD Test Guideline 425

Component: **Anisole**

Acute oral toxicity LD50 rat 3,700 mg/kg

Component: **Diazo Photoactive Compound**

Acute oral toxicity Very low toxicity if swallowed.
Harmful effects not anticipated from swallowing small amounts.

Component: **2-Methyl Butyl Acetate**

Acute oral toxicity LD50 rat 12,306 mg/kg

Component: **n-amyl acetate**

Acute oral toxicity LD50 rat > 1,600 mg/kg

Component: **Cresol**

Acute oral toxicity LD50 rat 100 - 300 mg/kg

Component: **Dioxane**

Acute oral toxicity LD50 rat > 5,000 mg/kg

Component: **Ethyl lactate**

Acute inhalation toxicity LC0 rat 4 Hour 5.4 mg/l

- Component: **Diazo Photoactive Compound**
Acute inhalation toxicity No adverse effects are anticipated from single exposure to dust.
- Component: **2-Methyl Butyl Acetate**
Acute inhalation toxicity LC50 rat 4 Hour > 5.2 mg/l
- Component: **n-amyl acetate**
Acute inhalation toxicity 16,000 mg/m³
- Component: **n-amyl acetate**
Acute inhalation toxicity no data available
- Component: **Cresol**
Acute inhalation toxicity LC50 rat 8 Hour 35.38 mg/l
- Component: **Dioxane**
Acute inhalation toxicity Prolonged excessive exposure may cause serious adverse effects, even death.
May cause central nervous system effects.
Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs.
Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed.
May cause pulmonary edema (fluid in the lungs.)
- Component: **Dioxane**
Acute inhalation toxicity LC50 rat 4 Hour 51.3 mg/l
- Component: **Ethyl lactate**
Acute dermal toxicity LD50 rat > 5,000 mg/kg
- Component: **Anisole**
Acute dermal toxicity The dermal LD50 has not been determined.
- Component: **Diazo Photoactive Compound**
Acute dermal toxicity Prolonged skin contact is unlikely to result in absorption of harmful amounts.
- Component: **2-Methyl Butyl Acetate**
Acute dermal toxicity LD50 rabbit 8,359 mg/kg
- Component: **n-amyl acetate**
Acute dermal toxicity LD50 rabbit > 17,500 mg/kg
- Component: **Cresol**
Acute dermal toxicity LD50 rabbit 213 - 426 mg/kg
- Component: **Dioxane**
Acute dermal toxicity LD50 rabbit > 7,000 mg/kg
- Component: **Anisole**
Skin irritation A single application to rabbit skin produced mild irritation.
- Component: **Diazo Photoactive Compound**

Skin irritation	No relevant data found.
Component: <u>2-Methyl Butyl Acetate</u>	
Skin irritation	rabbit Moderate irritation.
Component: <u>n-amyl acetate</u>	
Skin irritation	no data available
Component: <u>Cresol</u>	
Skin irritation	rabbit Causes burns.
Component: <u>Dioxane</u>	
Skin irritation	No skin irritation Brief contact is essentially nonirritating to skin. May cause drying and flaking of the skin. Prolonged contact may cause skin irritation with local redness.
Component: <u>Ethyl lactate</u>	
Eye irritation	moderate to severe. Single application to the rabbit eye produced conjunctival irritation.
Component: <u>Diazo Photoactive Compound</u>	
Eye irritation	No relevant data found.
Component: <u>2-Methyl Butyl Acetate</u>	
Eye irritation	rabbit Moderate eye irritation
Component: <u>n-amyl acetate</u>	
Eye irritation	slight irritation
Component: <u>Cresol</u>	
Eye irritation	rabbit Corrosive
Component: <u>Dioxane</u>	
Eye irritation	Eye irritation May cause slight eye irritation. May cause slight corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness.
Component: <u>Ethyl lactate</u>	
Sensitisation	no data available
Component: <u>Diazo Photoactive Compound</u>	
Sensitisation	No relevant data found.
Component: <u>Diazo Photoactive Compound</u>	
Sensitisation	No relevant data found.
Component: <u>2-Methyl Butyl Acetate</u>	
Sensitisation	HRIPT (human repeat insult patch test) human Not a sensitizer.
Component: <u>n-amyl acetate</u>	

Sensitisation	no data available
Component: <u>Dioxane</u> Sensitisation	For skin sensitization: No relevant information found.
Component: <u>Dioxane</u> Sensitisation	For respiratory sensitization: No relevant information found.
Component: <u>Ethyl lactate</u> Carcinogenicity:	no data available
Component: <u>Ethyl lactate</u> Reproductive toxicity	no data available
Component: <u>Ethyl lactate</u> Teratogenicity	Development effects were not observed in laboratory animals.
Component: <u>Ethyl lactate</u> Mutagenicity	Reverse mutation test using bacteria: Non-mutagenic with and without metabolic activation
Component: <u>Diazo Photoactive Compound</u> Subchronic toxicity	No relevant data found.
Component: <u>Diazo Photoactive Compound</u> Carcinogenicity:	No relevant data found.
Component: <u>Diazo Photoactive Compound</u> Reproductive toxicity	No relevant data found.
Component: <u>Diazo Photoactive Compound</u> Teratogenicity	No relevant data found.
Component: <u>Diazo Photoactive Compound</u> Mutagenicity	No relevant data found.
Component: <u>2-Methyl Butyl Acetate</u> Mutagenicity	Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Component: <u>n-amyl acetate</u> Subchronic toxicity	Inhalation rat NOAEL: 1,200 mg/kg none
Component: <u>n-amyl acetate</u> Carcinogenicity:	No data found
Component: <u>n-amyl acetate</u> Reproductive toxicity	No data found
	Exposure of pregnant rabbits to vapor at 1500 ppm resulted in maternal toxicity. The following effects were observed: decreased body weight. No adverse reproductive effects were observed in experimental animals.
Component: <u>n-amyl acetate</u>	

Teratogenicity

No data found

Component: **n-amyl acetate**

Mutagenicity

Not mutagenic in Ames Test.

Component: **Cresol**

Teratogenicity

Developmental effects were seen in laboratory animals only at dose levels that were maternally toxic.

Component: **Cresol**

Mutagenicity

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

Component: **Dioxane**

Subchronic toxicity

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

Liver.

Kidney.

Nasal tissue.

May cause central nervous system effects.

Component: **Dioxane**

Carcinogenicity: Human epidemiology studies have shown no indication that exposures to 1,4-dioxane in industrial situations have caused an increased incidence of tumors even though it has been shown to cause cancer in some laboratory animals.

Component: **Dioxane**

Reproductive toxicity

Limited data in laboratory animals suggest that the material does not affect reproduction.

Component: **Dioxane**

Teratogenicity

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

Component: **Dioxane**

Mutagenicity

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

12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

Ethyl lactate**Elimination information (persistence and degradability)****Biodegradability**

OECD Test Guideline 302
75 %

Ecotoxicity effects**Toxicity to fish**

LC50 Zebra fish (Danio/Brachydanio rerio) 96 Hour OECD Test
Guideline 203 or Equivalent
320 mg/l

Toxicity to algae ErC50 green alga Pseudokirchneriella subcapitata (formerly known as Selenastrum capricornutum) 96 Hour
3,500 mg/l

Toxicity to aquatic invertebrates EC50 Daphnia magna (Water flea) 48 Hour
560 mg/l

Anisole

Ecotoxicity effects

Toxicity to algae Growth rate EC50 Pseudokirchneriella subcapitata (green algae) 96 Hour
162 mg/l

Diazo Photoactive Compound

Elimination information (persistence and degradability)

Biodegradability

No relevant data found.

Bioaccumulation

No data available.

Ecotoxicity effects

Toxicity to fish

No relevant data found.

2-Methyl Butyl Acetate

Ecotoxicity effects

Toxicity to fish

LC50 Fathead minnow (Pimephales promelas) 96 Hour Method Not Specified
69 mg/l

Toxicity to algae

EC50 Pseudokirchneriella subcapita 96 Hour
>466 mg/l

Toxicity to aquatic invertebrates

EC50 Daphnia magna 48 Hour OECD Test Guideline 202 or Equivalent
40.9 mg/l

n-amyl acetate

Ecotoxicity effects

Toxicity to fish

LC50 Mosquito fish (Gambusia affinis) 96 Hour
65 mg/l

Toxicity to fish

no data available

Toxicity to algae

EC50 Algae 24 Hour
550 mg/l

Toxicity to algae

no data available

Toxicity to aquatic invertebrates

EC50 Daphnia magna 24 Hour
210 mg/l

Toxicity to aquatic invertebrates	no data available
Cresol	
Ecotoxicity effects	
Toxicity to fish	LC50 Zebra fish (Danio/Brachydanio rerio) 96 Hour Method Not Specified 9 mg/l
Toxicity to fish	LC50 Bluegill sunfish (Lepomis macrochirus) 96 Hour Method Not Specified 10 mg/l
Toxicity to fish	LC50 Pimephales promelas (fathead minnow) 96 Hour Method Not Specified 12.8 mg/l
Toxicity to bacteria	EC0 Pseudomonas putida 0.5 Hour 250 mg/l
Toxicity to aquatic invertebrates	LC50 Daphnia 48 Hour Method Not Specified 33 - 100 mg/l
Dioxane	
Elimination information (persistence and degradability)	
Biodegradability	Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.
Biodegradability	OECD Test Guideline 301C or Equivalent Not biodegradable. 29 % 10-day Window: Not applicable
Bioaccumulation	Cyprinus carpio (Carp) 42 d 25 °C Concentration: 10 mg/l Bioconcentration factor (BCF): 0.2 - 0.6
Ecotoxicity effects	
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).
Toxicity to fish	static test LC50 Pimephales promelas (fathead minnow) 96 Hour OECD Test Guideline 203 or Equivalent 13,000 mg/l
Toxicity to aquatic invertebrates	static test EC50 Daphnia magna (Water flea) 24 Hour OECD Test Guideline 202 or Equivalent 8,450 mg/l
Chemical Fate	

Biochemical Oxygen Demand (BOD)	20 %
Biochemical Oxygen Demand (BOD)	23 %
Biochemical Oxygen Demand (BOD)	30 %

13. DISPOSAL CONSIDERATIONS

Environmental precautions: Prevent the material from entering drains or water courses. Do not discharge directly to a water source. Advise Authorities if spillage has entered watercourse or sewer or has contaminated soil or vegetation.

Disposal

Dispose in accordance with all local, state (provincial), and federal regulations. Incineration is the recommended method of disposal for containers. Under RCRA, it is the responsibility of the product's user to determine at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because the product uses, transformations, mixtures, processes, etc. may render the resulting materials hazardous. Do not remove label until container is thoroughly cleaned. Empty containers may contain hazardous residues. This material and its container must be disposed of in a safe way.

14. TRANSPORT INFORMATION

DOT

Not regulated per 49CFR 173.150(f)(2)

Classification for SEA transport (IMO-IMDG):

Proper shipping name	RESIN SOLUTION
UN number	UN 1866
Class	3
Packing group	III

Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations.

15. REGULATORY INFORMATION

Workplace Classification

OSHA: Combustible
Irritant
Target organ effects

WHMIS: This product is a 'controlled product' under the Canadian Workplace Hazardous Materials Information System (WHMIS).

SARA TITLE III: Section 311/312 Categorizations (40CFR370): Immediate, delayed, flammability hazard

SARA TITLE III: Section 313 Information (40CFR372)

This product does not contain a chemical which is listed in Section 313 at or above de minimis concentrations.

United States TSCA Inventory (US.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.

California (Proposition 65)

This product does not contain materials which the State of California has found to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

NFPA Hazard Rating

Health	Fire	Reactivity
2	2	0

Legend

ACGIH	American Conference of Governmental Industrial Hygienists
BAC	Butyl acetate
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit (STEL):
TLV	Threshold Limit Value
TWA	Time Weighted Average (TWA):
	Bar denotes a revision from prior MSDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Version: 1.3
 Print Date: 02/19/2014

Layout 101100140