Safety Data Sheet

SHOWA DENKO K.K.
13-9, Shiba Daimon 1-Chome
Minato-Ku, Tokyo 105-8518, Japan

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SECTION 1: Product and company identification

Product Identifier

Product name: RIPOXY™ R-804JB

1.1 Recommended use of the chemical and restrictions on use:

Recommended use: Industrial use, matrix resin.

Restrictions on use: Any use other than the recommended use.

1.2 Supplier's details:

Company Name: SHOWA DENKO K.K.

Address: Functional Polymers Department,
Functional Chemicals Division,
13-9, Shiba Daimon 1-Chome,
Minato-Ku, Tokyo 105-8518, JAPAN

Telephone number: +81-3-5403-5600

Fax number: +81-3-5403-5720

1.3 Emergency telephone number: +81-791-67-1111 (available at holiday and night)

1.4 SDS No. FPPV-S2100UN-EN

SECTION 2: Hazard identification

This mixture is classified as "Hazardous" according to GHS.

2.1 Classification of the substance or mixture

2.1.1 Classification according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS):

Flammable Liquids Category 3
Acute toxicity (inhalation, vapour) Category 4
Skin corrosion/Irritation Category 2
Serious eye damage/Irritation Category 2
Germ Cell Mutagenicity Category 2
Reproductive Toxicity Category 1B
Specific Target Organ Toxicity – Single Exposure Category 3 (respiratory tract irritation)
Specific Target Organ Toxicity – Single Exposure Category 1 (central nervous system)
Specific Target Organ Toxicity – Repeated Exposure Category 1 (respiratory organ, liver, nervous system, blood)
Specific Target Organ Toxicity – Repeated Exposure Category 2 (adrenal gland, kidney)
Aquatic hazard (acute) Category 2

2.2 Label elements:

Product Name: RIPOXY™ R-804JB

Signal word: Danger

Pictograms:

Hazard statements:
H226: Flammable liquid and vapour.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H332: Harmful if inhaled.
H335: May cause respiratory irritation
H341: Suspected of causing genetic defects.
H360: May damage fertility or the unborn child.
H370: Causes damage to organs (central nervous system)
H372: Causes damage to organs (respiratory organ, liver, nervous system, blood) through prolonged or repeated exposure
H373: May cause damage to organs (adrenal gland, kidney) through prolonged or repeated exposure
H401: Toxic to aquatic life.

Precautionary statements:

Prevention:
P201: Obtain special instructions (Safty Data Sheet) before use.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/hot surfaces/other ignition sources. — No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/lighting/…/equipment.
P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response:
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P311: IF exposed or concerned: Gall a Poison center/doctor.
P308 + P313: IF exposed or concerned: Get medical advice/attention.
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P332 + P313: If skin irritation occurs: Get medical advice/attention.
P337 + P313: If eye irritation persists: Get medical advice/attention.
P362 + P364: Take off contaminated clothing and wash before reuse.
P370 + P378: In case of fire: Use powder chemical, carbon dioxide, alcohol-resistant foam, dry sand, water spray to extinguish.

Storage:
P403 + P233:Store in well-ventilated place. Keep container tightly closed
P403 + P235: Store in a well-ventilated place. Keep cool.
P405: Store locked up

Disposal:
P501: Dispose of contents/ container in accordance with local/regional/national/international regulations.

2.3 Other hazards

This product contains less than 0.3% of the ingredients of Respiratory sensitizer Category 1, Skin sensitizer Category 1 and Carcinogen Category 2.

SECTION 3: Composition/information on ingredients

3.1 Distinction of substance or mixture:

Mixture.

3.2 Chemical name (or generic name):

Vinyl ester resin

Information on ingredients:

CAS Number	Name	Weight % Content
Confidential	Bisphenol-based vinyl ester	52 – 56
100-42-5	Styrene	42 – 46
79-41-4	Methacrylic acid	<3
136-52-7	Cobalt 2-ethylhexanoate	0.1 - <0.3

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

Section 4: FIRST-AID MEASURES

4.1 Description of first aid measures

Ingestion: Rinse mouth. Do NOT induce vomiting.
Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact: If on skin (or hair): Take off immediately all contaminated clothing.
Wash with plenty of soap and water.
If skin irritation or rash occurs: Get medical advice/attention.

Eye contact: If in eyes: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.

Inhalation: If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.

First Aider Protection: Pay attention to fire.
Wear protective glasses, oil-resistant protective gloves and such protective equipment to prevent exposure of eye and skin.
Wear respiratory protection to prevent inhalation of vapour.

4.2 Most important symptoms and effects, both acute and delayed

General advice: Show this safety data sheet to medical personnel.

Causes symptoms of eye/skin redness, dizziness, headache, nausea, exhaustion, lowered level of consciousness, asthma and pulmonary edema. Symptoms related to asthma and pulmonary edema may appear later in many cases. Therefore, keep at rest, otherwise the symptoms may deteriorate. Prolonged or repeat exposure may cause damage to the adrenal glands, kidney, liver, central nervous system, respiratory organs and blood.

Ingestion: No data available.

Skin contact: Causes skin irritation.

Eye contact: Causes serious eye irritation.

Inhalation May cause respiratory irritation.

4.3 Indication of immediate medical attention and special treatment needed, if necessary.

Keep the victim at rest. Medical monitoring is essential. Treatment should be based on judgment of the doctor in response to symptoms of the patient

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable Extinguishing Media: Use powder chemical, carbon dioxide, alcohol-resistant foam, dry sand.
Unsuitable Extinguishing Media: Water jet.

5.2 Specific hazard arising from the substance or mixture

Heat may induce explosion of the container. Irritating toxic gas may be generated by combustion.

5.3 Special protective actions for fire-fighters

- Wear self-contained breathing apparatus for fire-fighting if necessary.
- Use powder chemical, carbon dioxide, alcohol-resistant foam, dry sand and such for the fire in its early stage.
- For a large fire, it is effective to shut off air using alcohol-resistant foam.
- For fire in the vicinity, sprinkle water to cool down the neighbouring facilities. Remove movable containers to a safe place immediately.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency measures

For non-emergency personnel:

- Immediately establish a suitable distance in all directions as leak area.
- Only authorised personnel should enter the leak area, utilising appropriate personal protective equipment.
- Approach from upwind.
- Ensure adequate ventilation.
- Prevent further leakage or spillage if safe to do so.
- For details of protective equipment, see Section 8.

For emergency responders:

- Ensure adequate ventilation.
- Wear positive pressure self-breathing apparatus.
- For details of protective equipment, see Section 8.

6.2 Environmental precautions

- Do not discharge onto the ground or into water courses.

6.3 Methods and material for containment and cleaning up

For containment:

- Wipe off residual spill with dry sand, saw dust or waste cloth and recover in a sealable container.
- Stop leakage if safe to do so.
- In case of large leakage, prevent the flow by surrounding the leakage with soil and recover in a sealable container.
- Rapidly remove all sources of ignition (ban of smoking, sparks and flame nearby).
- Prevent inflow into the drain, underground, or closed place.

For cleaning up:

Collect in a container which can be tightly closed and sealed (see section 13).

Other information:

After a fire, ventilate and clean the rooms before re-entry.

6.4 Reference to other sections

For personal protection, see Section 8.
For disposal of waste from clean-up operations, see Section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Do not handle until all safety precautions have been read and understood.
- Do not eat, drink and smoke in work areas.
- Wash hands thoroughly after handling.
- Wear protective gloves/ protective clothing/eye protection/face protection. See Section 8.
- Take off contaminated clothing and wash before reuse.
- Avoid heat, flames and other sources of ignition. Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting/equipment.
- Do not breathe mist/vapours/spray.
- Use only outdoors or in a well-ventilated area.
- Avoid release to the environment. Do not allow to enter drains, sewers or watercourses.

7.2 Conditions for safe storage, including any incompatibilities

- Store in closed original container. Keep container tightly closed.
- Store in a well-ventilated place. Keep cool.
- Store locked up.
- Keep away from heat, sparks and open flame.
- Protect from light, including direct sunlight.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.1.1 Occupational exposure limits for the components of the product (where available):

Substance	**Styrene**			
CAS No.	**100-42-5**			
	Limit value - Eight hours		**Limit value - Short term**	
	ppm	**mg/m³**	**ppm**	**mg/m³**
Australia	50	213	100	426
Austria	20	85	80	340
Belgium	50	216	100	432
Canada - Ontario	35	-	100	-
Canada - Québec	50	213	100	426
Denmark	25	105	25	105
France	50	215	-	-
Germany (AGS)	20	86	40 (1)	172 (1)
Germany (DFG)	20	86	40	172
Hungary	-	50	-	50
Ireland	20	85	40 (1)	170 (1)
Japan	50	-	-	-
Latvia	-	10	-	30 (1)
New Zealand	50	213	100	426
Poland	-	50	-	200
Singapore	50	213	100	426
South Korea	20	85	40	170
Spain	20	86	40	172
Sweden	10	43	20 (1)	86 (1)
Switzerland	20	85	40	170
Substance	**Styrene**			
CAS No.	**100-42-5**			
	Limit value - Eight hours		**Limit value - Eight hours**	
	ppm	**ppm**	**ppm**	**ppm**
USA - NIOSH	50	215	100 (1)	425 (1)

USA - OSHA	100	-	200	-
United Kingdom	100	430	250	1080

Germany (AGS): (1) 15 minutes average value
Germany (DFG): STV 15 minutes average value
Ireland: (1) 15 minutes reference period
Latvia: (1) 15 minutes average value
Sweden: (1) Short term value, 15 minutes average value
USA – NIOSH: (1) 15 minutes average value

Substance	**Methacrylic acid**			
CAS No.	**79-41-4**			
	Limit value - Eight hours		**Limit value - Short term**	
	ppm	**mg/m³**	**ppm**	**mg/m³**
Australia	20	70	-	-
Austria	20	70	-	-
Belgium	20	71	-	-
Canada - Ontario	20	-	-	-
Canada - Québec	20	70	-	-
Denmark	20	70	40	140
Finland	20	71	-	-
France	20	70	-	-
Germany (DFG)	5	18	10	36
Ireland	20	70	40 (1)	140 (1)
Latvia	-	10	-	-
New Zealand	20	70	-	-
People's Republic of China	-	3	-	-
Singapore	20	70	-	-
South Korea	20	70	-	-
Spain	20	72	-	-
Sweden	20	70	30 (1)	100 (1)
Switzerland	5	18	10	36
USA - NIOSH	20	70	-	-
United Kingdom	20	72	40	143

Germany (DFG): STV 15 minutes average value.
Ireland (1): 15 minutes reference period.
Sweden (1): Short-term value, 15 minutes average value.

Substance	**Cobalt and compounds (as Co)**			
	Limit value - Eight hours		**Limit value - Short term**	
	ppm	**mg/m³**	**ppm**	**mg/m³**
Australia	-	0.05	-	-
Austria	-	0.1	-	0.4
Belgium	-	0.02	-	-
Canada - Ontario	-	0.02	-	-
Canada - Québec	-	0.02	-	-
Substance	**Cobalt and compounds (as Co)**			
	Limit value - Eight hours		**Limit value - Short term**	
	ppm	**mg/m³**	**ppm**	**mg/m³**
Denmark	-	0.01	-	0.02
Hungary	-	0.1	-	0.4

Ireland	-	0.1	-	-
Japan	-	0.02 (1)	-	-
Latvia	-	0.5	-	-
New Zealand	-	0.05 (1)	-	-
Poland	-	0.02	-	-
Singapore	-	0.02	-	-
South Korea	-	0.02	-	-
Spain	-	0.02	-	-
Sweden	-	0.02 (1)	-	-
Switzerland	-	0.05 inhalable aerosol	-	-
The Netherlands	-	0.02	-	-
USA - OSHA	-	0.1	-	-
United Kingdom	-	0.1	-	-

Austria: TRK value (based on technical feasibility)

Japan: (1) Cobalt and inorganic compounds

New Zealand: (1) Exposure can also be estimated by biological monitoring.

Sweden: cobalt and inorganic compounds

The Netherlands: Dust and fume

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of work day.

8.2.2 Individual protection measures, such as personal protective equipment

Respiratory protection: In case of insufficient ventilation, wear suitable respiratory equipment – gas mask for organic gas, air-supplied mask, self-contained breathing apparatus.
Use self-contained breathing apparatus in all circumstances when the mask and cartridge do not give adequate protection.
Use only respiratory protection that conforms to international/ national standards.

Eye protection: Protective glasses with side shields. Use only eye protection that conforms to international/national standards.

Skin protection: Oil-resistant protective gloves. Use only gloves that conforms to international/national standards. Protective clothing (anti-static) and protective shoes (anti-static) are recommended.

Hygiene measures: When using do not eat or drink.
Smoking is strictly prohibited.
Wash hands well after use.
Handle in accordance with good industrial hygiene and safety practice.

8.2.3 Environmental exposure controls

Do not allow to enter drains, sewers or watercourses.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	Pale yellow viscous liquid.
Odour:	Aromatic hydrocarbon odour.
Odour threshold:	No data available.
pH:	Not applicable.
Melting point/freezing point:	-30.6°C (styrene)
Boiling point:	145°C (styrene)
Initial boiling point and boiling range:	Unknown.
Flash point:	32°C (Seta closed cup method.)
Evaporation rate:	No data available.

Flammability (solid, gas):	Not applicable.
Upper/lower flammability or Explosive limits:	Explosive limits: 0.7 – 6.8 vol% (styrene)
Vapour pressure:	0.7 kPa, 20 °C (styrene)
Vapour density:	3.59 (air=1, 20°C) (styrene)
Specific gravity:	1.0 – 1.2 (25°C)
Solubility:	Insoluble in water, soluble in acetone and such organic solvent.
Partition coefficient (n-octanol/water):	Log Pow = 2.95 (styrene)
Auto-ignition temperature:	490°C (styrene)
Decomposition temperature:	No data available.
Viscosity:	0.20 – 0.35 Pa.s (25°C)
Explosive properties:	No data available.
Oxidising properties:	No data available.
Surface tension:	No data available.

9.2 Other information

No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity

Polymerization is caused by heat, light, and peroxides.

10.2 Chemical stability

Stable when stored in a tightly closed container in a cool dark place.

10.3 Possibility of hazardous reactions

·Flammable mixtures.
Polymerization reaction is caused by heat, light and such, and generates heat.

10.4 Conditions to Avoid

Do not use materials that containers are permeable to constituents or soluble materials.
Avoid high temperatures, heat, direct sunlight, flames and sparks and discharge of static electricity.

10.5 Incompatible materials

Avoid using materials, which are permeable to the component or contact with the materials, which are soluble in the component.
When peroxide is mixed for hardening, do not add excessively.

10.6 Hazardous decomposition products

Carbon monoxide and carbon dioxide are generated by thermal decomposition.

SECTION 11: Toxicological information

11.1 Toxicological information of the product

・No information about all of the items.

11.2 Toxicological information of Bisphenol-based vinyl ester

・No information about all of the items.

11.3 Toxicological information of styrene

Acute toxicity (oral)	:	・Rat, LD50 5000 mg/kg (Initial Risk Assessmen Report)
Acute toxicity (inhalation:vapour)	:	・Rat, LC50(4hr) 2770 ppm (11690 mg/m3) (Initial Risk Assessment Report)
Skin corrosion/irritation	:	・In skin irritation tests using rabbits, severe irritation and partial degeneration were observed on the skin. (Initial Risk Assessment Report)
Serious eye damage/eye irritation	:	・Moderate conjunctival irritation and damage lasted for seven days in rabbit eye irritation test. (Initial Risk Assessment Report)
Skin sensitisation	:	No data available.

Respiratory sensitisation	:	No data available.
Germ cell mutagenicity	:	・In chromosomal aberration tests in which bone marrow cells were observed in rats that were exposed by inhalation, the results showed positive. (Initial Risk Assessment Report)
		・In sister chromatid exchange tests in which bone marrow cells were observed in mice that were exposed by inhalation, the results showed positive. (Initial Risk Assessment Report)
		・In sperm morphological abnormalities tests in mice and rats, the results showed positive. (Initial Risk Assessment Report)
		・In Ames tests using Salmonella, the results showed negative. (Initial Risk Assessment Report)
Carcinogenicity	:	・IARC Carcinogenicity classification: Group 2B (Possibly Carcinogenic to Humans)
		・ACGIH Carcinogenicity classification: A4 (Not Classifiable as a Human Carcinogen)
		・No significant increase of mortality from cancer was noted in cohort follow up study of 40688 workers exposed to styrene in 660 European factories. (EU-RAR)
Reproductive toxicity	:	・In 3-generation reproduction studies using rats (administered with drinking water), there was no effect on the parents (F0) in 250 ppm group; however, significant reduction in the survival rate of offspring was observed (F1). (Initial Risk Assessment Report)
		・In tests where rats were exposed to this substance by inhalation during 7-21 days of pregnancy, abnormalities were observed in reflex and other parameters in behavior test in the groups exposed at 50 ppm or above. (Initial Risk Assessment Report)
		・In tests where mice were exposed to this substance by inhalation in 6-16 days of pregnancy, increase of embryo/fetal death rate was observed in 250 ppm group and increase of skeletal mutations was observed in the F1 generation. (Initial Risk Assessment Report)
		・In oral administration tests to male rats for 60 days, decrease in sperm counts in the epididymis was observed in 200 mg/kg/ day group. NOAEL was 100 mg/kg/day (Initial Risk Assessment Report)
Specific target organ toxicity (single exposure)	:	・In tests where mice, rats and guinea-pigs were exposed to this substance by inhalation, effect on central nervous system, including tremors or loss of consciousness, and irritation to eye, nose and lungs were observed. (Initial Risk Assessment Report)
		・In tests where volunteers were exposed by inhalation for 1.5 hours, delay in their response to visual and auditory stimuli was observed in groups exposed at 50 mL/m3 or above. (Initial Risk Assessment Report)
Specific target organ toxicity (repeated exposure)	:	・Styrene causes chronic bronchitis, obstructive pulmonary disorder, and decline in the digestive functions of stomach by prolonged inhalation exposure. (Initial Risk Assessment Report)
		・Decrease in platelet counts was observed in employees in a styrene resin factory (estimated exposure level: 100 - 300 ppm). (Initial Risk Assessment Report)
		・Decline of function was noted in neuropsychological test in workers who were exposed to 10-300 ppm of this substance in factory. (Initial Risk Assessment Report)
		・Hepatocellular necrosis was observed during tests in which mice were exposed at 259 ppm for 14 days. (Initial Risk Assessment Report)
Aspiration hazard	:	・Swallowing the liquid may cause chemical pneumonia due to aspiration into lungs. (ICSC)

11.4 Toxicological information of Methacrylic acid

Acute toxicity (oral)	:	Rat, LD50 1060 - 2260 mg/kg (Initial Risk Assessme Report)

Acute toxicity (dermal)	:	Rabbit, LD50 500 - 2000 mg/kg (Initial Risk Assessment Report)
Acute toxicity (inhalation: mist)	:	Rat, LC50 1981 ppm/4hr (Initial Risk Assessment Report)
Skin corrosion / irritation	:	Corrosion was noted in skin irritation study using the Rabbit after application for 3 minutes (Initial Risk Assessment Report).
Serious eye damage / irritation	:	Corneal opacity and other symptoms were observed at 1 day after instillation in eye irritation study using the Rabbit. The symptoms did not recover even after 7 days and chemical burn, corneal epithelial necrosis and defect, and etc., were observed (Initial Risk Assessment Report).
Skin sensitization	:	Not sensitising in skin sensitisation study using the Guinea-pig (Initial Risk Assessment Report). A positive result is seen in the reports of human study but most of the results are negative (Initial Risk Assessment Report).
Respiratory sensitization	:	No information.
Germ cell mutagenicity	:	Negative in reverse mutation test using Salmonella typhimurium (Initial Risk Assessment Report).
Carcinogenicity	:	No information.
Reproductive toxicity	:	Effect to genitalia was not noted in 90-days exposure study (highest concentration: 1071 mg/m3) in the Rat and Mouse (Environmental Risk Assessment of Chemicals, Ministry of the Environment).
Specific target organ toxicity -single exposure	:	Irritation to eye and upper respiratory tract were observed at 0.4 - 3 mg/m3 in a study in volunteers (Initial Risk Assessment Report).
Specific target organ toxicity -repeated exposure	:	Tendency of decrease in platelet number, tremor of fingers and such nervous symptoms, etc., were observed in the workers in the main working environment at 20 - 80 mg/m3 (Initial Risk Assessment Report). In 90-days inhalation exposure study in the Mouse, denaturing of Nasal cavity olfactory was observed in 100ppm or more, and nasal catarrh, number of leukocyte decrease, and becoming gigantic of renal nephric tubule epithelium were observed in 300ppm. NOAEL was 20 ppm (Initial Risk Assessment Report). Decrease of reflex ability, atrophy of liver, kidney and adrenal gland, decrease of red blood cell were observed in 5 mg/kg/day group in 6-months oral administration study in the Rat. NOAEL was 0.05 mg/kg/day (Initial Risk Assessment Report).
Aspiration hazard	:	No data available.

11.5 Toxicological information of Cobalt 2-Ethylhexanoate

Acute toxicity (oral)	:	Rat, LD50 = 1.22 g/kg (US HPV Challenge, RTECS)
Acute toxicity (dermal)	:	Guinea-pig, LD50 >5 g/kg (US HPV Challenge, RTECS)
Acute toxicity (inhalation: mist)	:	Rat, LC50(1hr) > 10.0 mg/L (aerosol) (US HPV Challenge, RTECS)
Skin corrosion / irritation	:	No data available.
Serious eye damage / irritation	:	No data available.
Skin sensitization	:	Classified as Sah (danger of sensitization of the airways and the skin) by DFG MAK, Germany. (cobalt compound) Allergic reaction was noted in a man who was exposed to this substance for 35 years in patch test of cobalt chloride. (HSDB)
Respiratory sensitization	:	Classified as Sah (danger of sensitization of the airways and the skin) by DFG MAK, Germany. (cobalt compound)
Germ cell mutagenicity	:	Negative in reverse mutation test using Salmonella typhimurium. (US HPV Challenge) Negative in DNA repair test using Escherichia coli. (US HPV Challenge) Negative as the result of observation of bone marrow in in vivo micronucleus test by oral administration in mouse. (US HPV Challenge)

Carcinogenicity	:	Carcinogen classification by IARC: (cobalt compound) Group 2B (Possibly carcinogenic to humans)
Reproductive toxicity	:	No data available.
Specific target organ toxicity -single exposure	:	No data available.
Specific target organ toxicity -repeated exposure	:	No data available.
Aspiration hazard	:	No data available.

SECTION 12: Ecological information

12.1 Ecological information of the product

: No information about all of the items.

12.2 Ecological information of unsaturated polyester

: No information about all of the items.

12.3 Ecological information of styrene

Ecotoxicity	:	・Fish (Fathead minnow) LC50 (96hr) 4.02 mg/L (Initial Risk Assessment Report) ・Crustacea (Daphnia magna) EC50(48hr) 4.7 mg/L (Initial Risk Assessment Report) ・Algae (Selenastrum) ErC50(72hr) 4.9 mg/L (Initial Risk Assessment Report)
Persistence and degradability	:	・Judged to be readily biodegaradable in 2-weeks biodegradation study based on Chemical Substance Control Law. (Safety Assessment Data of Existing Chemical Substance)
Bioaccumulative potential	:	・BCF = 13.5 (goldfish), 37 (calculated value) (Initial Risk Assessment Report) ・Octanol/water partition coefficient: logPow = 2.95 (measured value), 2.89 (calculated value) (Initial Risk Assessment Report)
Mobility in soil	:	・Soil absorption/desorption coefficient, Koc = 960 (HSDB)
Hazardous to the ozone layer	:	No data available

12.4 Ecological information of Methacrylic acid

Ecotoxicity	:	Fish (Rainbow trout) LC50 (96hr) 85 mg/L (Initial Risk Assessment Report) Crustacea (Daphnia magna) EC50 (48hr) >130 mg/L, NOEC (21day) 53 mg/L (Initial Risk Assessment Report) Algae (Selenastrum) ErC50 (72hr) 14 mg/L, NOEC (72hr) 8.2 mg/L (Initial Risk Assessment Report)
Persistence / degradability	:	Judged to be readily biodegradable in 2-weeks biodegradation study based on Chemical Substance Control Law (Safety Assessment Data of Existing Chemical Substance)
Bioaccumulative potential	:	BCF = 0.2 (calculated value) (Initial Risk Assessment Report) Octanol/water partition coefficient: log Pow = 0.93 (measured value), 0.99 (calculation) (Initial Risk Assessment Report)
Mobility in soil	:	Soil adsorption coefficient: Koc = 15 (HSDB)
Hazardous to the ozone layer	:	No information.

12.5 Ecological information of Cobalt 2-Ethylhexanoate

No information about all of the items.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

It follows the regulations of the importing country.

13.1.1 Residual wastes

In accordance with local and national regulations.

13.1.2 Contaminated containers and packaging
In accordance with local and national regulations.

13.2 Other information: None

SECTION 14: Transport information

14.1	**UN Number:**	1866
14.2	**UN proper shipping name:**	RESIN SOLUTION, flammable
14.3	**Transport hazard class(es)**:	3
14.4	**Packing group:**	III
14.5	**Environmental hazards:**	No
14.6	**Special Precautions for user:**	None
14.7	**Transport in bulk according to Annex II of Marpol 73/78 and the IBC Code:**	Not applicable.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) (Rev. 5, 2013).

SECTION 16: Other information

Methods of evaluation:

The mixture was classified using test data available for the neat substances with the application of relevant concentration limits, in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

References:

Disseminated REACH registration dossiers for styrene and methacrylic acid available on ECHA website. Accessed 04 June 2015.

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) (Rev. 5, 2013).

Abbreviations:

BCF: Bioaccumulation factor

Koc: Adsorption coefficient

QSAR: Quantitative structure–activity relationship

STOT – repeated exposure: Specific target organ toxicity – repeated exposure

STOT – single exposure: Specific target organ toxicity – single exposure

Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

The information contained herein is carefully presented, based on the data we have. However, all precautions described herein are for normal handling, not for special handling. Please establish the safe usage in accordance with your handling procedures by reference to this SDS and applicable laws and guidance. In addition, the description, composition, and physical/chemical properties are typical values and not guaranteed for this product. When using the product, it must be handled in accordance with applied laws and regulations in that country or territory.