SHOWA DENKO K.K.

13-9, Shiba Daimon 1-chome,
Minato-Ku, Tokyo, 105-8518,

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SAFETY DATA SHEET

1. Identification of the substance/preparation and of the company/undertaking

Trade name	:	RIPOXY ™ R-806DA-EX
Company/undertaking identification	:	SHOWA DENKO K.K.
Address	:	13-9, Shiba Daimon 1-chome, Minato-Ku, Tokyo, 105-8518, Japan
Department name	:	Functional Chemicals Division / Functional Polymers Department
Tel.	:	+81-3-5403-5600
Fax	:	+81-3-5403-5720
Emergency number	:	+81-791-67-1111(holiday and night) (Tatsuno Plant, SHOWA DENKO K.K.)
Recommended uses and restrictions	:	Industrial use
Reference no.	:	FPPV-62740JP-EN

2. Hazards identification

[GHS classification]

Physical hazards	:	Flammable liquids, Category 3
Health hazards	:	Acute toxicity (inhalation:vapour) , Category 4
		Skin corrosion/irritation, Category 1
		Serious eye damage/eye irritation, Category 1
		Respiratory sensitization, Category 1
		Skin sensitization, Category 1
		Germ cell mutagenicity, Category 2
		Reproductive toxicity, Category 1B
		Specific target organ toxicity — single exposure, Category 1 (central nervous system)
		Specific target organ toxicity — single exposure, Category 2 (respiratory system)
		Specific target organ toxicity — Single exposure, Category 3 (respiratory tract irritation)
		Specific target organ toxicity — Repeated exposure, Category 1 (respiratory system, liver, nervous system, blood)
		Specific target organ toxicity — Repeated exposure, Category 2 (adrenal, kidneys)
Environmental hazards	:	Hazardous to the aquatic environment — Acute Hazard, Category 2

Other hazards than mentioned above are Not applicable or No data available.

[GHS label elements]

Hazard pictograms :

Signal word : Danger

Hazard statements :
(H226) Flammable liquid and vapour
(H314) Causes severe skin burns and eye damage.
(H317) May cause an allergic skin reaction.
(H332) Harmful if inhaled
(H334) May cause allergy or asthma symptoms or breathing difficulties if inhaled.
(H335) May cause respiratory irritation
(H341) May cause genetic defects
(H360) May damage fertility or the unborn child
(H370) Causes damage to organs (central nervous system)
(H371) May cause damage to organs (respiratory system).
(H372) Causes damage to organs (respiratory system, liver, nervous system, blood) through prolonged or repeated exposure
(H373) May cause damage to organs (adrenal, kidneys) through prolonged or repeated exposure
(H401) Toxic to aquatic life

Precautionary statements

Prevention precautionary statements :
(P201) Obtain special instructions (Safety 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. - 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, forearms and face thoroughly after handling
(P270) Do not eat, drink or smoke when using this product
(P271) Use only outdoors or in a well-ventilated area
(P272) Contaminated clothing should not be allowed out of the workplace
(P273) Avoid release to the environment
(P280) Wear protective gloves/protective clothing/eye protection/face protection
(P284) Wear respiratory protection

Response Precautionary Statements :
(P301+P330+P331) If Swallowed : Rinse mouth. Do not induce vomiting
(P302+P352) If on skin : Wash with plenty of soap and water
(P304+P340) If inhaled ; Remove to fresh air and keep at rest in a position 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: Call a POISON CENTER/doctor
(P308+P313) IF exposed or concerned: Get medical advice/attention
(P310) Immediately call a POISON CENTER or doctor
(P312) Call a POISON CENTER or doctor/physician if you feel unwell
(P333+P313) If skin irritation or rash occurs: Get medical advice/attention
(P342+P311) If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
(P362+P364) Take off contaminated clothing and wash it before reuse
(P363) Wash contaminated clothing before reuse
(P370+P378) In case of fire: Use carbon dioxide (CO2), Dry extinguishing powder, dry sand, alcohol resistant foam, water spray for extinction

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

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

Other hazards : This product contains a component of Specific target organ toxicity — Repeated exposure, Category 2 (liver) less than 5%

3. Composition/information on ingredients

Distinction of substance or mixture : Mixture

Generic name : Vinylester resin

Name	CAS No	Conc.	Formula	Kanpo number	
				CSCL	ISHL
Vinylester	Confidential	47 - 51%	Confidential	Confidential (Existing Chemical Substance)	Confidential (Existing Chemical Substance)
Styrene	100-42-5	42 - 46%	CH_2=CH-C_6H_5	(3)-4	Existing Chemical Substance
Acrylic acid	79-10-7	3 - 5%	$C_3H_4O_2$	(2)-984	Existing Chemical Substance
Methyl methacrylate	80-62-6	1 - 3 %	$C_5H_8O_2$	(2)-1036	Existing Chemical Substance
Methacrylic acid	79-41-4	< 2%	CH_2=C(CH_3)COOH	(2)-1025	Existing Chemical Substance

4. First aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
If you feel unwell, seek medical advice.

First-aid measures after skin contact : Take off the affected clothing Immediately, wash skin with running water / shower.
If skin irritation or rash occurs: Get medical advice/attention.
When this product touches skin, it is necessary to initiate washing as soon as possible and wash it away completely.
If initiation of the irrigation is late or insufficient, dermopathy may be caused.

First-aid measures after eye contact : Rinse eyes immediately with low pressured flowing water for over 15 minutes.
Consult an eye specialist.
When this product touches eye, it is necessary to initiate washing as soon as possible and wash it away completely.
If initiation of the irrigation is late or insufficient, irreversible ophthalmic injury may be caused.

First-aid measures after ingestion : Rinse mouth with water, do not induce vomiting, call a doctor.
Because this product is escharotic, risk rather increases when vomit it forcibly.
Immediately call a POISON CENTER or doctor .

Most Important Symptoms/Effects : Dizziness, headaches, nausea, red flare, weakness, deterioration of consciousness, asthma, lung edema.

Personal Protection in First Aid and Measures : Wear suitable protective clothing, gloves and eye or face protection.
Wear respiratory protection.

Other medical advice or treatment : Keep quiet and prolonged medical observation is needed.
When the medical wound is observed, strip the pollutant and treat it like a conventional scald allowance.

5. Fire fighting measures

Suitable extinguishing media : carbon dioxide (CO_2), Dry extinguishing powder, dry sand, alcohol resistant foam, Water spray

Unsuitable extinguishing media : Water jet

Fire hazard : Heat may cause pressure rise with explosion of the package.
On burning: release of harmful/irritant gases/vapours.

Firefighting instructions : Apply water spray or fog to cool nearby equipment.
Move undamaged containers from immediate hazard area if it can be done safely.
Approach from upwind.
Early fire: use dry extinguishing powder, carbon dioxide (CO_2), dry sand.
Massive fire: use alcohol resistant foam to shut off air.

Personal protection (Emergency response) : Use a self-contained breathing apparatus and also a protective suit.
Do the fire fighting from windward side to avert inhale a hazardous gas.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures	:	Wear suitable protective clothing, gloves and eye or face protection. Do the operation from windward side and evacuate persons around leeward side area. Prepare extinguishing medias in preparation for ignition.
Environmental precautions	:	Pay attention that products never flow out to river etc. and never cause influence to the environment.
Methods and Equipment for Containment and Cleaning up	:	Take up liquid spill into absorbent material, e.g.: sand, saw dust. Store in a closed container. In the case of a large amount leakage, fenced by a clod or cloth and prevent the flowing. Collect leaking and spilled liquid in sealable containers. Because this is an acidic product, it must be neutralized in alkali (soda ash, hydrated lime).
Prevention Measures for Secondary Accidents	:	Eliminate all ignition sources if safe to do so. Prepare extinguishing medias in preparation for ignition. Notify authorities if liquid enters sewers or public waters.

7. Handling and storage

Handling

Technical measures	:	Provide ventilation system and use necessary personal protective equipment as described in "8. Exposure controls / Personal protection equipment."
Local and general ventilation	:	Treat in the local ventilation area, or in the place operating the general ventilation system.
Precautions for safe handling	:	Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Don't handle a container roughly, as falling down, falling damage in loading and dragging. Never touch, inhale and eat. Handle product only in closed system or provide appropriate exhaust ventilation.
Hygiene measures	:	Wash hands thoroughly after handling. Remove contaminated clothes. Wash contaminated clothing before reuse.

Storage precautionary statements

Storage conditions	:	Keep out of direct sunlight. Store in a cool, well-ventilated place. Comply with relevant laws such as Fire Service Law and Industrial Safety and Health Law.
Material used in packaging/containers	:	Use containers provided by Fire Service Law and United Nations Recommendations on the Transport of Dangerous Goods.

8. Exposure controls / Personal protection equipment

Product

Japan administration level	:	No information
	:	No information

Vinylester

Japan administration level	:	No information
Exposure limits (JSOH)	:	No information
Exposure limits (ACGIH)	:	No information

Styrene

Japan administration level	:	20ppm
Exposure limits (JSOH)	:	20ppm(85mg/m3) (skin)
Exposure limits (ACGIH)	:	TWA 20 ppm,STEL 40 ppm

Acrylic acid

Japan administration level	:	No information
Exposure limits (JSOH)	:	No information
Exposure limits (ACGIH)	:	TWA 2ppm ,STEL - (skin)

Methyl methacrylate

Japan administration level	:	No information
Exposure limits (JSOH)	:	2ppm
Exposure limits (ACGIH)	:	TWA 50ppm, STEL 100ppm

Methacrylic acid

Japan administration level	:	No information
Exposure limits (JSOH)	:	2ppm
Exposure limits (ACGIH)	:	TLV-TWA 20ppm (70mg/m3)
Others	:	Germany, DFG MAK-TWA 5ppm

Appropriate engineering controls : Install the local exhaust ventilation in handling area.
Emergency safety showers should be available in the immediate vicinity of any potential exposure.
Install hand-washing and eye-washing etc. station.

Protective equipment

Respiratory protection	:	Approved organic vapour respirator. Self contained breathing apparatus. Air-supplied respirator.
Hand protection	:	Oleum-proof gloves
Eye protection	:	Tightly fitting safety goggles
Skin and body protection	:	Non-static creating clothing and conductive shoes

9. Physical and chemical properties

Form	:	Thick liquid
Colour	:	Light yellow
Odour	:	Hydrocarbons, aromatic
pH	:	Not applicable
Melting point	:	-30.6℃(styrene)
Boiling point	:	145℃(styrene)
Flash point	:	32 ℃ (seta closed cup)
Explosive limits (g/m³)	:	No data available
Explosive limits (vol %)	:	0.7 - 6.8vol%(styrene)
Vapour pressure	:	0.7kPa(20℃)(styrene)
Relative vapour density at 20 ℃	:	3.59(air=1、20℃)(styrene)
Specific gravity density	:	1.0 - 1.2(25℃)
Solubility	:	Not soluble in water. Soluble in organic solvents.
Log Pow	:	2.95(styrene)
Auto-ignition temperature	:	490℃(styrene)
Decomposition temperature	:	No data available
Viscosity	:	0.05 - 0.15 Pa.s (25℃)

10. Stability and reactivity

Reactivity	:	Can polymerise exothermically if heated, exposed to air, sunlight or by addition or free radical initiators.
Chemical stability	:	The product is stable at normal handling and storage conditions. Stable under sealed condition in a cool, well-ventilated place.
Possibility of hazardous reactions	:	No data available
Conditions to avoid	:	Light (daylight). Overheating. Static electrical charge. Do not use perforated, permeable or soluble materials.
Incompatible materials	:	Do not use peroxides in excess amount for curing.
Hazardous decomposition products	:	Carbon monoxide. Carbon dioxide.

11. Toxicological information

Toxicological information of Product

: No information about all of the items

Toxicological information of Vinylester

: No information about all of the items

Toxicological information of Styrene

Acute toxicity (oral)	:	Rat, LD50 = 5000 mg/kg (Initial Risk Assessment of the Chemical Substances)
Acute toxicity (inhalation: vapour)	:	Rat, LC50 (4hr) = 2770 ppm (11690 mg/m3) (Initial Risk Assessment of the Chemical Substances)
Skin corrosion / irritation	:	Severe irritation and partial degeneration were observed in a skin irritation study using the Rabbit. (Initial Risk Assessment of the Chemical Substances)
Serious eye damage / irritation	:	Moderate conjunctival irritation and damage lasted for 7 days in an eye irritation study using the Rabbit. (Initial Risk Assessment of the Chemical Substances)
Skin sensitization	:	No information.
Respiratory sensitization	:	No information.
Germ cell mutagenicity	:	Positive in the observation of bone marrow cell in chromosome aberration study by inhalation exposure in the Rat. (Initial Risk Assessment of the Chemical Substances) Positive in the observation of bone marrow cell and etc., in sister chromatid exchange analysis by inhalation exposure in the Mouse. (Initial Risk Assessment of the Chemical Substances) Positive in sperm morphology aberration assay in the Mouse and Rat. (Initial Risk Assessment of the Chemical Substances) Negative in Ames test using Salmonella typhimurium. (Initial Risk Assessment of the Chemical Substances)
Carcinogenicity	:	Carcinogenicity classification of IARC: Group 2B (possibly carcinogenic to humans). Carcinogenicity classification of ACGIH: A4 (not classifiable as a human carcinogen) No significant increase was detected in the mortality and etc., in the followup survey of 40688 workers who were exposed to styrene in 660 factories in EU. (EU-RAR)
Reproductive toxicity	:	No effect was noted in parental animals of 250 ppm treated group (F0) but significant decrease in survival rate was noted in pups (F1) in three-generation reproduction study using Rat (administration by drinking-water). (Initial Risk Assessment of the Chemical Substances) Aberration in righting reflex and such many parameters of behavioral tests was noted in pups of the groups treated at 50 ppm and above in inhalation exposure study in the Rat during day 7-21 of pregnancy. (Initial Risk Assessment of the Chemical Substances) Increase of embryonic/fetal mortality and skeletal variation in F1 generation were noted in 250 ppm treated group in inhalation exposure test in the Mouse during 6-16 day of pregnancy. (Initial Risk Assessment of the Chemical Substances) Decrease of number of sperm in epididymis, etc., were noted in 200 mg/kg/day group in 60-day oral dose administration study in male Rat. NOAEL is 100 mg/kg/day. (Initial Risk Assessment of the Chemical Substances)
Specific target organ toxicity -single exposure	:	Tremor, loss of consciousness and such effect to central nervous system, irritation to eye, nose and lung were noted in inhalation exposure studies in the Mouse, Rat and the Guinea-pig. (Initial Risk Assessment of the Chemical Substances) Delayed response to visual and auditory stimulation was noted at and above 50 mL/m3 in 1.5-hour inhalation exposure study in volunteers. (Initial Risk Assessment of the Chemical Substances)
Specific target organ toxicity -repeated exposure	:	Styrene causes chronic bronchitis, obstructive lung damage and disorder of digestive function in stomach by long-term inhalation exposure. (Initial Risk Assessment of the Chemical Substances) Decrease of thrombocyte and etc., were noted in the workers at styrene resin plant (estimated exposure concentration at 100-300 ppm). (Initial Risk Assessment of the Chemical Substances) Functional disorder was noted in neuropsychiatric functional examination in the workers who were exposed to the substance at 10-300 ppm in the plant. (Initial Risk Assessment of the Chemical Substances)

		Necrosis of hepatocyte was noted at 259 ppm in 14-day inhalation exposure test in the Mouse. (Initial Risk Assessment of the Chemical Substances)
Aspiration hazard	:	If liquid styrene is swallowed, chemical pneumonia may be caused due to aspiration to lung. (ICSC)

Toxicological information of Acrylic acid

Acute toxicity (oral)	:	Rat, LD50, 140-3200 mg/kg (Hazard Assessment Report), 33.5 mg/kg, 1337 mg/kg (Environmental Risk Assessment)
Acute toxicity (dermal)	:	Rabbit, LD50, 295-950 mg/kg (Hazard Assessment Report)
Acute toxicity (inhalation: vapour)	:	Rat, LC50(4hr), 1221ppm, >1737 ppm (Hazard Assessment Report)
Acute toxicity (inhalation: mist)	:	Mouse, LC50(2hr), 5300 mg/m3, Rat, LCLo(1hr) 4105 mg/m3, LCLo(4hr) 11800 mg/m3 (Environmental Risk Assessment)
Skin corrosion / irritation	:	Erythema and oedema were observed in application of 50% aqueous solution for a minute on Rabbit skin. (Hazard Assessment Report, EHC, EU-RAR)
Serious eye damage / irritation	:	Scar in palpebra, corneal opacity were observed even after 20 days of application of stock solution in Rabbit eye in an eye irritation study (Hazard Assessment Report, EHC, EU-RAR)
Skin sensitization	:	Two results of sensitiser and non-sensitiser are available in skin sensitisation study using the Guinea-pig. However, sensitising effect was considered to be due to the impurities. (Hazard Assessment Report, EHC, EU-RAR)
		It is reported that sensitising symptoms have not been noted in more than 450 workers who handled industrial product of acrylic acid since 1989. (EHC, EU-RAR)
Respiratory sensitization	:	No information.
Germ cell mutagenicity	:	Negative as the result of observation of bone marrow in in vivo chromosome aberration by oral administration in the Rat, negative in dominant lethal mutation test by oral administration in the Mouse. (Hazard Assessment Report , Environmental Risk Assessment)
		Negative in reverse mutation test using Salmonella typhimurium, gene mutation test using CHO cells, unscheduled DNA synthesis test using the primary cultured Rat hepatocytes. (Hazard Assessment Report, Environmental Risk Assessment)
		Positive in Mouse lymphoma assay, chromosome aberration test using CHO and CHL cell. (Hazard Assessment Report, Environmental Risk Assessment)
Carcinogenicity	:	Carcinogen classification by IARC: Group 3 (not classifiable as to its carcinogenicity to humans)
		Carcinogen classification by ACGIH: A4 (not classifiable as a human carcinogen)
Reproductive toxicity	:	Effect was not noted in fertility, reproduction results and morphology of pups (external, visceral, skeletal) in two-generation study by 70-days administration in drinking water in the Rat. (Environmental Risk Assessment)
		Lacrimation, nasal discharge were observed at 360 ppm but effect was not noted in the number of preimplantation loss, live fetus, resorption, incident of malformation, anomaly or delay in inhalation exposure study in the Rat during 6-15 days of gestation. (Environmental Risk Assessment)
		Crust around nose, nasal congestion were observed at 225 ppm but effect was not noted in the number of corpus luteum, implantation sites, live fetus, incident of malformation in inhalation exposure study in the Rabbit during 6-18 days of gestation. (Environmental Risk Assessment)
Specific target organ toxicity -single exposure	:	Necrosis and inflammation of gastric mucosal epithelium, degeneration and necrosis of hepatocyte were observed in oral administration study in male Rat at 700-1100 mg/kg (Hazard Assessment Report)
		Severe inflammation of bronchial mucosa, focal inflammation in pulmonary parenchyma were observed in inhalation exposure study in the Rat at 1008, 1221 ppm. (Hazard Assessment Report)
		Infiltration around nose, crust formation due to respiratory irritation were observed in systemic exposure to saturated vapour of acrylic acid in the Rat. (Hazard Assessment Report)
Specific target organ toxicity -repeated exposure	:	Focal degeneration of nasal olfactory epithelium in the Mouse at and above 5 ppm, degeneration of nasal olfactory epithelium in the male and female Rat at 75 ppm in 90-days inhalation exposure study in the Rat and Mouse. (Environmental Risk Assessment)

Degeneration of nasal olfactory epithelium, atrophy, enlargement of basal cell accompanied with differentiated squamous cell, necrosis of epithelium with desquamation were observed in 15-days inhalation exposure study in female Mouse. (Hazard Assessment Report)

Gastric bloat, cyanosis, difficult breathing, congestion in liver, degeneration and fragmentation in kidney were observed in the groups at and above 150 mg/kg/day in 90-days administration in drinking water in the Rat. (Hazard Assessment Report)

Aspiration hazard : No information.

Toxicological information of Methyl methacrylate

Acute toxicity (oral) : Rat, LD50, 7900 mg/kg, 8500 mg/kg (ECETOC)

Acute toxicity (dermal) : Rat, LD50, 7500 mg/kg (Initial Risk Assessment of the Chemical Substances)

Rabbit, LD50 > 5000 mg/kg (RTECS)

Acute toxicity (inhalation: vapour) : Rat, LC50(4 hours), 7093 ppm (ECETOC, Initial Risk Assessment of the Chemical Substances)

Skin corrosion / irritation : Severe erythema, moderate to severe oedema were observed and irritation was noted even at 14 days later in skin irritation study using the Rabbit. (ECETOC, Initial Risk Assessment Report)

Serious eye damage / irritation : Slight irritation was noted in conjunctivae but eye irritation was not observed at and after 48 hours in an eye irritation study using the Rabbit. (Initial Risk Assessment Report)

Redness of grade 2 was observed in conjunctivae in an eye irritation study using the Rabbit (mild to moderate eye irritation). (EU-RAR, ACGIH)

Skin sensitization : Group 2 skin sensitiser in the classification of Japan Society for Occupational Health.

Skin sensitiser (allergic dermatitis) (EU-RAR, ACGIH)

Respiratory sensitization : Group 2 respiratory sensitiser in the classification of Japan Society for Occupational Health.

Germ cell mutagenicity : Negative response was shown in an in vivo dominant lethal test with germ cells. (EU-RAR, ECETOC)

Results were not judged to be positive in an in vivo mutagenicity test with somatic cells (chromosome aberration test, micronucleus test). (EU-RAR, ECETOC)

Negative response was shown in the Ames test using S. typhimurium. (Initial Risk Assessment Report)

Positive in sister chromatid exchanges in CHO cells. (Initial Risk Assessment Report)

Carcinogenicity : Carcinogen classification by IARC: Group 3 (not classifiable as to its carcinogenicity to humans)

Carcinogen classification by ACGIH: A4 (not classifiable as a human carcinogen)

Reproductive toxicity : Inhalation exposure caused fetotoxicity in Rats on day 6-15 of gestation at a dose at which maternal toxicity (e.g. death) occurred. (EU-RAR, Initial Risk Assessment Report)

No fetotoxicity was observed in Rats on day 6-15 of gestation that were exposed to methyl methacrylate by inhalation. NOAEL was 2028 ppm. (Initial Risk Assessment Report)

Specific target organ toxicity -single exposure : Respiratory tract irritation, weakness, pyrexia, dizziness, nausea, headache and drowsiness were reported in humans. (EU-RAR)

Specific target organ toxicity -repeated exposure : Symptoms including atrophic rhinitis, laryngitis, autonomic disturbance, nervous debility, headache, dizziness and nervousness were observed in humans. (Environmental Risk Assessment)

104-week inhalation exposure caused degeneration and atrophy in the olfactory epithelium in rats. NOAEL was 25 ppm. (Initial Risk Assessment Report)

Aspiration hazard : No information.

Toxicological information of Methacrylic acid

Acute toxicity (oral) : Rat, LD50 = 1060 - 2260 mg/kg (Initial Risk Assessment of the Chemical Substances)

Acute toxicity (dermal) : Rabbit, LD50 = 500 - 2000 mg/kg (Initial Risk Assessment of the Chemical Substances)

Acute toxicity (inhalation: mist) : Rat, LC50 = 1981 ppm/4hr (Initial Risk Assessment of the Chemical Substances)

Skin corrosion / irritation : Corrosion was noted in skin irritation study using the Rabbit after application for 3 minutes (Initial Risk Assessment of the Chemical Substances).

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 of the Chemical Substances).
Skin sensitization	:	Not sensitising in skin sensitisation study using the Guinea-pig (Initial Risk Assessment of the Chemical Substances). A positive result is seen in the reports of human study but most of the results are negative (Initial Risk Assessment of the Chemical Substances).
Respiratory sensitization	:	No information.
Germ cell mutagenicity	:	Negative in reverse mutation test using Salmonella typhimurium (Initial Risk Assessment of the Chemical Substances).
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).
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 of the Chemical Substances).
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 of the Chemical Substances). 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 of the Chemical Substances). 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 of the Chemical Substances).
Aspiration hazard	:	No information.

12. Ecological information

Ecological information of Product

: No information about all of the items

Ecological information of Vinylester

: No information about all of the items

Ecological information of Styrene

Ecotoxicity	:	Fish (Fathead minnow) LC50(96hr), 4.02mg/L (Initial Risk Assessment of the Chemical Substances) Crustacea (Daphnia magna) EC50(48hr), 4.7mg/L (Initial Risk Assessment of the Chemical Substances) Algae (Selenastrum) ErC50(72hr) 4.9mg/L, (Initial Risk Assessment of the Chemical Substances)
Persistence / degradability	:	Readily biodegradable in 2-weeks biodegradation study in accordance with Chemical Substance Control Law. (Safety Assessment Data of Existing Chemical Substance)
Bioaccumulative potential	:	BCF = 13.5 (Golden fish), 37 (calculation) (Initial Risk Assessment of the Chemical Substances) Octanol/water partition coefficient: logPow=2.95 (measured value), 2.89 (calculated value) (Initial Risk Assessment of the Chemical Substances)
Mobility in soil	:	Soil absorption coefficient, Koc=960 (HSDB)
Hazardous to the ozone layer	:	No information.

Ecological information of Acrylic acid

Ecotoxicity	:	Fish (Rainbow trout), LC50 (96hr) = 27 mg/L (CERI/NITE, Initial Risk Assessment of the Chemical Substances) Crustacea (Daphnia magna) EC50(48hr) 47～95mg/L (CERI/NITE, Initial Risk

Assessment of the Chemical Substances)

Algae (Scenedesmus), ErC50(72hr) 0.13mg/L, NOEC(72hr) 0.016～0.025mg/L (EHC, CERI/NITE, Initial Risk Assessment of the Chemical Substances)

Persistence / degradability	:	Concluded 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 = 3.2 (Estimated to be low level of bioaccumulation) (CERI/NITE, Initial Risk Assessment of the Chemical Substances, Environmental Risk Assessment)
Mobility in soil	:	Soil absorption coefficient, Koc＝43(Environmental Risk Assessment) , Koc＝1 (CERI/NITE, Initial Risk Assessment of the Chemical Substances)
Hazardous to the ozone layer	:	No information.

Ecological information of Methyl methacrylate

Ecotoxicity	:	Fish (Fathead minnow), LC50(96hr), 130 mg/L (Initial Risk Assessment of the Chemical Substances)
		Crustacea (Daphnia magna), EC50(48hr), 69 mg/L (Initial Risk Assessment of the Chemical Substances)
		Algae (Selenastrum), EbC50(96hr), 170 mg/L (Initial Risk Assessment of the Chemical Substances)
Persistence / degradability	:	Judged to be readily biodegradable in 2-weeks biodegradation study based on the Japanese Chemical Substance Control Law (Safety Assessment Data of Existing Chemical Substance)
Bioaccumulative potential	:	Bio-concentration factor, BCF = 2.3 (calculation) (Initial Risk Assessment of the Chemical Substances)
		Estimated to be low level of bioaccumulation in aquatic organisms (Initial Risk Assessment of the Chemical Substances)
Mobility in soil	:	No information.
Hazardous to the ozone layer	:	No information.

Ecological information of Methacrylic acid

Ecotoxicity	:	Fish (Rainbow trout) LC50 (96hr) = 85 mg/L (Initial Risk Assessment of the Chemical Substances)
		Crustacea (Daphnia magna) EC50 (48hr) >130 mg/L, NOEC (21day) = 53 mg/L (Initial Risk Assessment of the Chemical Substances)
		Algae (Selenastrum) ErC50 (72hr) = 14 mg/L, NOEC (72hr) = 8.2 mg/L (Initial Risk Assessment of the Chemical Substances)
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 (calculation) (Initial Risk Assessment of the Chemical Substances)
		Octanol/water partition coefficient: log Pow = 0.93 (measured value), 0.99 (calculation) (Initial Risk Assessment of the Chemical Substances)
Mobility in soil	:	Soil adsorption coefficient: Koc = 15 (HSDB)
Hazardous to the ozone layer	:	No information.

13. Disposal considerations

Ecology - waste materials	:	Dispose of contents/container under national government /prefectural and city governments /cities, towns and villages regulations. Dispose of contents/container in accordance with licensed collector’s sorting instructions.
Contaminated container and packagingDisposal	:	Assure disposal complies with applicable regulations. Dispose of contents/container in accordance with licensed collector’s sorting instructions. Empty the packaging completely prior to disposal.

14. Transport information

International Regulations

UN-No. (ADR)	:	2920
Class (ADR)	:	8
Subsidiary Risk		3
Proper Shipping Name (ADR)	:	Corrosive liquid, Flammable N.O.S.
Packing group (UN)	:	II
Domestic regulations		
Precautions for transport	:	Based on relevant regulations in section 15, transport this product.
Other information		
ERG No	:	132
	:	Load containers without turnover, drop and friction. Take measure certainly to prevent containers from collapsing. Check if there are no leaks. Keep containers tightly colsed.

15. Regulatory information

Japanese Pollutant Release and Transfer Register Law (PRTR Law) : Class 1 Designated Chemical Substances (Act Art.2 para. 2, Enforcement Oder Art.1 Appended Table No.1)
Styrene (44%)
Acrylic acids and the water soluble salt (3.8%)
Methacrylic acid (1.1%)
Methyl methacrylate (1.9%)

Industrial Safety and Health Law : Group 2 Specified Chemical Substance, Special Organic Solvents (Ordinance on Prevention of Hazards Due to Specified Chemical Substances Art.2 Para.1, Items 2, 3-2, 3-3)
Styrene
Specified Chemical Substances, Special Control Substances (Ordinance on Prevention of Hazards Due to Specified Chemical Substances Art.38-3)
Styrene
Working Environment Evaluation Standards, Administrative Control Levels (Law Art.65-2, Para.1)
Styrene
Dangerous and Harmful Substances Subject to Indicate Their Names (Law Art.57, Enforcement Oder Art.18, Item 1, Item 2, Attached Table No.9)
Styrene
Acrylic acid
Methacrylic acid
Methyl methacrylate
Dangerous and Harmful Substances Subject to Notify Their Names (Law Art.57-2, Enforcement Oder Art.18-2, Item 1, Item 2, Attached Table No.9)
Styrene
Acrylic acid
Methacrylic acid
Methyl methacrylate
Dangerous Substances - Flammable Substance (Enforcement Order Attached Table 1 Item 4)
Styrene
Acrylic acid
Methyl methacrylate
Substances with Health Hazards Prevention Guideline (Law Art.28 Para 3, MHLW Published Guideline)
Styrene

Japanese Poisonous and Deleterious Substances Control Law : Not applicable

Chemical Substances Control Law : Priority Assessment Chemical Substances (Article 2, Paragraph (5) of the Act)
Styrene
Acrylic acid
Methacrylic acid

Water Pollution Prevention Law : Designated Materials (Article 2, Paragraph 4 of the Law, Article 3-3 of the Enforcement Order)
Styrene

Acrylic acid

Fire Service Law	:	Group 4 - Flammable liquids - 2nd Class petroleums - Insoluble (Law Art.2 Para.7, Attached Table 1, Group 4)
Offensive Odor Control Law	:	Specified Offensive Odor Substances (Law Art.2-1, Enforcement Order Art.1) Styrene
Air Pollution Control Law	:	Hazardous Air Pollutants (Central Environment Council Report No. 9) Styrene Methacrylic acid Methyl methacrylate Volatile Organic Compounds (Law Art.2 Para.4) (MOE Official Notice to Prefectures) Styrene Acrylic acid Methyl methacrylate Volatile Organic Compounds (Law Art.2, Para 4) (Investigation Report for VOC Emission in 2002) Methacrylic acid
Law Relating to Prevention of Marine Pollution and Maritime Disasters	:	Dangerous substance (Flammable Substances) (Law Art.3,(6)-2, Enforcement Order, Art.1-7, Attached Table No.1-4) Styrene Noxious Liquid Substances - Category Y (Law Art.3(3), Enforcement Order, Art.1-2, Attached Table No.1 Item 2) Styrene Acrylic acid Methacrylic acid Methyl methacrylate
Ship Safety Act	:	Corrosive substance (Regulations for the carriage and storage of dangerous goods, Art.2- 3, Notification for Establishing Standards for the Carriage of Dangerous Goods Attached table No.1)
Civil Aeronautics Law	:	Corrosive substance (the enforcement regulations) Art.194, Notification for Establishing Standards for the Carriage of Dangerous Goods Attached table No.1)
Port Regulation Law	:	Dangerous substance (not otherwise specified), Corrosive substance (Act Art.21, Para.2, Regulations Art.12, Notification to determine the modality of the dangerous article, Attached table)
Road Act	:	Restriction for Vehicle Traffic (Enforcement Order Art.19-13, Publication of Japan Highway Pablic Corp.)
Law for the Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes (Basel Convention)	:	Hazardous Substances Containing in Waste (Act Cat.2 para (1) Item (I) (a), 3 Ministry Notification No.2 of 1993) Styrene Acrylic acid Methacrylic acid Methyl methacrylate
Labor Standards Act	:	Chemical Substances Causing Occupational Illnesses (Act Art.75, Para.2, Ordinance Attached Table 1-2, Item 4-1,MHLW Notification No.36 of 1978 Styrene Methyl methacrylate Sensitizing potential substances(Act Art.75, Para.2, Ordinance Attached Table 1-2, Item 4,MHLW) Methyl methacrylate

16. Other information

Name	TSCA	EC No	IECSC
Vinylester	Listed	Not applicable	Listed

Styrene	Listed	202-851-5	Listed
Acrylic acid	Listed	201-177-9	Listed
Methacrylic acid	Listed	201-204-4	Listed
Methyl methacrylate	Listed	201-297-1	Listed

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The statements, contents, figures and other physical and chemical properties are not guaranteed. Hazard assessment, which has been prepared on the basis of documents and other information currently available data, it does not cover all the documents were not so, please use caution when handling.

This SDS is translation of a Japanese version. (JIS Z 7253-2012)
When using this product outside Japan, it must be handled in accordance with applied laws and regulations in each country or territory.