



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™ FC-83S GREY 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
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 Emergency number : +81-791-67-1111 (holiday and night) (Tatsuno Plant, SHOWA DENKO K.K.)
 Recommended uses and restrictions : Industrial use
 Reference no. : FPPV-R1040JP-EN

2. Hazards identification

[GHS classification]

Physical hazards : Flammable liquids, Category 3
 Health hazards : Acute toxicity (inhalation:vapour) Category 4
 : Skin corrosion/irritation, Category 2
 : Serious eye damage/eye irritation, Category 2
 : Respiratory sensitization, Category 1
 : skin sensitization, Category 1
 : Germ cell mutagenicity, Category 1B
 : Carcinogenicity, Category 2
 : Reproductive toxicity, Category 1B
 : Specific target organ toxicity — single exposure, Category 1 (central nervous 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 (central nervous system)
 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
 (H315) Causes skin irritation

- (H317) May cause an allergic skin reaction
- (H319) Causes serious eye irritation
- (H332) Harmful if inhaled
- (H334) May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- (H335) May cause respiratory irritation
- (H340) May cause genetic defects
- (H351) Suspected of causing cancer
- (H360) May damage fertility or the unborn child
- (H370) Causes damage to organs (central nervous system)
- (H372) Causes damage to organs (respiratory system, liver, nervous system, blood) through prolonged or repeated exposure
- (H373) May cause damage to organs (central nervous system) 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 work 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 :
- (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
 - (P312) Call a POISON CENTER or doctor/physician if you feel unwell
 - (P332+P313) If on skin and if skin irritation occurs, seek medical advice and attention
 - (P333+P313) If skin irritation or rash occurs: Get medical advice/ attention
 - (P337+P313) If eye irritation persists: 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
 - (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 which do not result in classification

- : This product contains a component of reproductive toxicity category 1A less than 0.3%

3. Composition/information on ingredients

Distinction of substance or mixture : Mixture
 Generic name : Vinylester resin

Name	CAS No	Conc. %	Formula	Kanpo number	
				CSCS	ISHL
Vinylester resin	Confidential	33 - 37%	Confidential	Confidential (Existing Chemical Substance)	Confidential (Existing Chemical Substance)
Styrene	100-42-5	24 - 28%	CH ₂ =CH-C ₆ H ₅	(3)-4	Existing Chemical Substance
Glass flake	Confidential	23 - 27%	Confidential	Confidential (Existing Chemical Substance)	Confidential
Titanium dioxide	13463-67-7	2 - 4%	TiO ₂	(1)-558	Existing Chemical Substance
Inorganic filler	Confidential	2 - 4%	Confidential	Confidential (non-subject)	Confidential
Methyl methacrylate	80-62-6	1 - 3%	C ₅ H ₈ O ₂	(2)-1036	Existing Chemical Substance
Amorphous silica A	67762-90-7	0.7-0.9%	SiO ₂	(1)-548	Existing Chemical Substance
Cobalt naphthenate	61789-51-3	0.3-0.5%	(C ₁₀ H ₁₀ COO) ₂ Co	(8)-630	Existing Chemical Substance
Ethylbenzene	100-41-4	0.2-0.4%	C ₈ H ₁₀	(3)-28	Existing Chemical Substance
Amorphous silica B	7631-86-9	0.2-0.4%	SiO ₂	(1)-548	Existing Chemical Substance
Xylene	1330-20-7	0.2-0.4%	C ₈ H ₁₀	(3)-3	Existing Chemical Substance
Ethyl alcohol	64-17-5	0.1-0.3%	C ₂ H ₆ O	(2)-202	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 : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. Seek medical attention if irritation develops.

First-aid measures after eye contact : Rinse eyes immediately with low pressured flowing water for over 15 minutes. Consult an eye specialist.

First-aid measures after ingestion : Rinse mouth with water, do not induce vomiting, call a doctor. If the person vomits, keep body inclined to avoid inhaling the vomit into the lung. The vomit can hurt lung.

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.

5. Fire fighting measures

Suitable extinguishing media : carbon dioxide (CO₂), 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 tanks/drums. 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 (CO₂), 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	:	Wear suitable protective clothing, gloves and eye or face protection.
Equipment and Emergency Procedures	:	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.
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 AND PERSONAL PROTECTION."
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
Exposure limits	:	No information

Vinylester resin

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

Glass flake

Japan administration level	:	3.0mg/m3
Exposure limits (JSOH)	:	【Dust exposure limit】 Class 3, Respirable dust: 2mg/m3, Total dust: 8mg/m3
Exposure limits (ACGIH)	:	10mg/m3 (Inhalational dust), 3mg/m3 (Respirable dust)

Titanium dioxide

Japan administration level	: 3.0 mg/m ³
Exposure limits (JSOH)	: 【Dust exposure limit】 Class 2, Respirable dust; 1mg/m ³ , Total dust; 4mg/m ³
Exposure limits (ACGIH)	: TWA 10 mg/m ³ ,STEL -

Inorganic filler

Japan administration level	: No information
Exposure limits (JSOH)	: 【Dust exposure limit】 Class 1, Respirable dust; 0.5mg/m ³ , Total dust; 2mg/m ³
Exposure limits (ACGIH)	: TWA 2 mg/m ³

Methyl methacrylate

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

Amorphous silica A

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

Cobalt naphthenate

Japan administration level	: No information
Exposure limits (JSOH)	: 0.05mg/m ³ (Co)
Exposure limits (ACGIH)	: No information

Ethylbenzene

Japan administration level	: 20ppm
Exposure limits (JSOH)	: 50ppm(217mg/m ³)
Exposure limits (ACGIH)	: TLV-TWA 20 ppm, TLV-STEL 125 ppm

Amorphous silica B

Japan administration level	: No information
Exposure limits (JSOH)	: 【Dust exposure limit】 Class1, Respirable dust; 0.5mg/m ³ , Total dust; 2mg/m ³
Exposure limits (ACGIH)	: No information

Xylene

Japan administration level	: 50ppm
Exposure limits (JSOH)	: 50ppm(217mg/m ³)
Exposure limits (ACGIH)	: TWA 100 ppm, STEL 150 ppm

Ethyl alcohol

Japan administration level	: No information
Exposure limits (JSOH)	: No information
Exposure limits (ACGIH)	: TWA -,STEL 1000 ppm

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	: GREY
Odour	: Hydrocarbons, aromatic
pH	: Not applicable

Melting point	: -30.6°C (styrene)
Boiling point	: 145°C (styrene)
Flash point	: 32 °C (seta closed cup)
Explosive limits (g/m ³)	: No data available
Explosive limits (vol %)	: 0.7 - 6.8vol% (styrene)
Vapour pressure	: 0.7kPa (20°C) (styrene)
Relative vapour density at 20 °C	: 3.59 (air=1, 20°C) (styrene)
Specific gravity density	: 1.3 - 1.4 (25°C)
Solubility	: Not soluble in water. Soluble in organic solvents.
Log Pow	: 2.95 (styrene)
Auto-ignition temperature	: 490°C (styrene)
Decomposition temperature	: No data available
Viscosity	: 2.0 - 2.7 Pa.s (25°C)

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 resin

: 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/m ³) (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 Glass flake

- : No information about all of the items

Toxicological information of Titanium dioxide

- Acute toxicity (oral) : Rat, LD50 > 10000 mg/kg (IUCLID, Environmental Risk Assessment)
- Acute toxicity (dermal) : Rabbit, LD50 > 10000 mg/kg (IUCLID, Environmental Risk Assessment)
- Acute toxicity (inhalation: dust) : Rat, LC50 > 6.82 mg/L/4hr (IUCLID, Environmental Risk Assessment)
- Skin corrosion / irritation : In an skin irritation study in Rabbits and cases for human, some showed no irritation, and others showed slight irritation. (IUCLID)
- Serious eye damage / irritation : Slight irritation was observed in an eye irritation study in Rabbits. (IUCLID)
- Skin sensitization : Skin sensitisation was not observed in Buehler test using the Guinea-pig. (IUCLID)
- Skin sensitization was not observed in 48-hours patch test in 290 dermatitis patients. (IUCLID)
- Respiratory sensitization : No information.
- Germ cell mutagenicity : Negative in chromosome aberrations and sister chromatid exchanges in bone marrow cells of mice via intraperitoneal injection. (NTP)
- Positive and negative results were reported in the micronucleus test with bone marrow cells of mice following intraperitoneal injection. (Environmental Risk Assessment)
- Positive in gene mutation in alveolar epithelial cells of rats following intratracheal administration. (Environmental Risk Assessment)
- Carcinogenicity : Carcinogen classification by IARC: Group 3 (not classifiable as to its carcinogenicity to humans)
- Carcinogenicity : Carcinogen classification by ACGIH: A4 (not classifiable as a human carcinogen)
- Reproductive toxicity : No effect was observed on male or female reproductive organs in rats or mice given a 103-week dietary administration. (Environmental Risk Assessment)

- Specific target organ toxicity -single exposure : Only nonspecific reactions were observed in rats and Rabbits given an intratracheal administration of 25-50 mg and 400 mg, respectively, dust particles. (HSDB)
Concentrated fumes irritate the respiratory tract. (HSDB)
- Specific target organ toxicity -repeated exposure : An investigation of 67 workers in a small titanium oxide paint factory in Nigeria found that they had respiratory tract and nervous system symptoms and 42% of those worker had pulmonary function impairment. (HSDB)
In rats exposed to titanium dioxide by inhalation for 2 years, the incidence of pneumonia and rhinitis increased and bronchial lymph node enlargement occurred at 10 mg/m³ or more; and effects on the lung, pleurisy, etc., were observed at 50 mg/m³ or more. (Environmental Risk Assessment)
In rats and mice given a dietary administration, no effect was observed on body weights and tissues. The NOAEL was 5% (2500 mg/kg/day for rats). (Environmental Risk Assessment)
- Aspiration hazard : No information.

Toxicological information of Inorganic filler

- Acute toxicity (oral) : No information.
- Acute toxicity (dermal) : No information.
- Acute toxicity (inhalation: dust) : No information.
- Skin corrosion / irritation : Mild irritation was observed in a human skin irritation test. (RTECS, IUCLID, MSDS-OHS)
No irritation was observed in a Rabbit skin irritation test. (IUCLID)
Direct contact with titanium dioxide may lead to mechanical irritation in the skin. (MSDS-OHS)
- Serious eye damage / irritation : In an eye irritation study in Rabbits, some showed no irritation, and others showed slight irritation. (IUCLID)
Direct exposure to dust may lead to mechanical irritation in the eye. (MSDS-OHS)
- Skin sensitization : There are no data for experimental animals. However, human exposure data obtained for several decades suggest that the inorganic filler has no skin sensitisation. (IUCLID)
- Respiratory sensitization : No information.
- Germ cell mutagenicity : Negative for in vivo chromosome aberrations in rats treated orally. (DOSE, HSDB)
A negative response was shown in a mutagenicity test using Salmonella typhimurium and UDS test using Rat pleural mesothelial cells. (IUCLID, CCRIS, DOSE, HSDB)
Negative in chromosome aberration test in cultured human cells. (DOSE, HSDB)
- 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 : No teratogenicity was noted in rats and mice on day 6-15 of gestation and hamsters on day 6-10 of gestation following oral administration. (IUCLID, DOSE, ACGIH)
- Specific target organ toxicity -single exposure : Inhalation exposure to high concentrations may lead to irritation of mucosae and bronchi. (MSDS-OHS)
A large dose may cause irritation of the digestive system.(MSDS-OHS)
- Specific target organ toxicity -repeated exposure : A 4-week inhalation exposure induced effects on the lung, pleura and respiration in rats and mice. (RTECS, MSDS-OHS, HSDB)
A repeated exposure of the eye caused inflammation in the retina and symblepharon. (MSDS-OHS)
Chronic repeated inhalation exposure to dust may cause pulmonary fibrosis with breath shortness, chronic cough and heart failure. (MSDS-OHS)
In a 2-year study in mice, cells in the upper respiratory tract changed, and accumulation of macrophages and chronic inflammation occurred in the lung. (MSDS-OHS)
- 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)
- Acute toxicity (dermal) : 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	:	A 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) A negative response was shown in the Ames test using <i>S. typhimurium</i> . (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	:	An 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. (risk assessment report by the Ministry of Environment) A 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 Amorphous Silica A

Acute toxicity (oral)	:	Species unknown, LD50 > 5000 mg/kg (MSDS-OHS)
Acute toxicity (inhalation: mist)	:	(Fume) Rat, LC0, 2.08 mg/m ³ /4hr (MSDS-OHS)
Skin corrosion / irritation	:	Acute exposure to amorphous silica A may lead to irritation or dryness in the skin. (MSDS-OHS)
Serious eye damage / irritation	:	Acute exposure to amorphous silica A may lead to mild irritation in the eye. Amorphous silica A may damage the eye if it is deposited. (MSDS-OHS)
Skin sensitization	:	No information.
Respiratory sensitization	:	No information.
Germ cell mutagenicity	:	No information.
Carcinogenicity	:	No information.
Reproductive toxicity	:	No information.
Specific target organ toxicity -single exposure	:	Temporary discomfort, gasping and breath shortness may appear if acute inhalation exposure to amorphous silica A occurs. (MSDS-OHS) No death was observed in Rats exposed to fumes at 2.08 mg/m ³ for 4 hours. (MSDS-OHS)
Specific target organ toxicity -repeated exposure	:	In Rats exposed to amorphous silica A at a total dose of 30 mg/kg for 4 weeks, changes in the lung, thorax and respiration, hemorrhage and deaths were observed. (RTECS) Chronic inhalation may cause a change in an X-ray image of the lung and inhalation of a large dose may lead to pneumoconiosis. (MSDS-OHS) Pulmonary fibrosis was reported in workers exposed, but there was no effect on pulmonary functions. (MSDS-OHS)

In a study in Rats, most animals died of vascular occlusion of the lung as well as pulmonary function insufficiency due to emphysema. (MSDS-OHS)

Aspiration hazard : No information.

Toxicological information of Cobalt naphthenate

- Acute toxicity (oral) : Rat, LD50 3900mg/kg (RTECS)
- Acute toxicity (oral) : Acute toxicity in Rat oral administration is low. (BIBRA)
- Acute toxicity (dermal) : Dermal toxicity in the Rabbit is from moderate to mild. (BIBRA)
- Skin corrosion / irritation : Redness, pain are caused in contact with skin. (ICSC)
- Serious eye damage / irritation : Mild irritation was noted in an eye irritation test using Rabbit. (RTECS, BIBRA)
Irritant to eye and respiratory tract in short-term inhalation of aerosol. (ICSC)
- Skin sensitization : Cobalt: Group 1 sensitizer (airway, skin) (Japan Society for Occupational Health)
(Note: The classification is applicable to the substance itself and its compounds.
However not all substances are identified for sensitization.)
Cobalt compounds: Sah (airway and skin sensitizer), risk of skin absorption.
(DFGMAK)
Skin sensitising property to human has been reported. (BIBRA)
Skin sensitization may be caused by repeated or prolonged contact. (ICSC)
- Respiratory sensitization : Cobalt: Group 1 sensitizer (airway, skin) (Japan Society for Occupational Health)
(Note: The classification is applicable to the substance itself and its compounds.
(However not all substances are identified for sensitization.)
Cobalt compounds: Sah (airway and skin sensitizer), risk of skin absorption.
(DFGMAK)
- Germ cell mutagenicity : Positive in chromosome aberration study using CHO cell. (EPA TSCATS Low Detail Report, USA)
Negative in Mouse lymphoma study using Mouse lymphoma cell. (CCRIS)
Both negative and positive reports are available for Ames test using Salmonella typhimurium (CCRIS, NTP)
- Carcinogenicity : Carcinogenicity classification of IARC: Group 2B (possibly carcinogenic to humans) (cobalt and compounds)
Carcinogenicity classification of Japan Society for Occupational Health: Group 2B (the substances which are probably or possibly carcinogenic to humans (the substances with less carcinogenic possibility to humans)).
Incident of tumor in muscles of hindlimb of 8 animals was noted in intramuscular administration in the Mouse. (IARC, HSDB)
Incident of tumor was noted in 8 animals within 2-6 months after intramuscular, intravenous, intrathoracic or intrahepatic administration study in male Rabbit. (IARC)
- Reproductive toxicity : No information.
- Specific target organ toxicity -single exposure : No information.
- Specific target organ toxicity -repeated exposure : No information.
- Aspiration hazard : No information.

Toxicological information of Ethylbenzene

- Acute toxicity (oral) : Oral, Rat LD50 = 3500 – 4700 mg/kg (NITE, Initial Risk Assessment of the Chemical Substances)
- Acute toxicity (dermal) : Dermal, Rabbit LD50 = 15400 mg/kg (NITE, Initial Risk Assessment of the Chemical Substances).
- Acute toxicity (inhalation:vapour) : Inhalation, vapour, Rat LC50 = 4000 ppm/4hr (17.2 mg/L/4hr) (NITE, Initial Risk Assessment of the Chemical Substances).
- Skin corrosion / irritation : Mild irritant in skin irritation study using the Rabbit (NITE, Initial Risk Assessment of the Chemical Substances).
- Serious eye damage / irritation : Mild irritation was noted in cornea in eye irritation study using the Rabbit but no effect to cornea was noted. Mild irritation was noted in another study (NITE, Initial Risk Assessment of the Chemical Substances).
- Skin sensitization : Negative in skin sensitization study by application on human skin (SIDS).
- Respiratory sensitization : No information.
- Germ cell mutagenicity : Negative in chromosome aberration study in vitro using CHO cell (NITE, Initial Risk Assessment of the Chemical Substances).
Negative in Ames test using Salmonella typhimurium and Escherichia coli. (Initial Risk Assessment of the Chemical Substances)

		Negative in Chromosome aberration test using CHO cells. (NITE, Initial Risk Assessment of the Chemical Substances).
Carcinogenicity	:	IARC, Group 2B (possibly carcinogenic to humans) ACGIH, A3 (confirmed animal carcinogen with unknown relevance to humans)
Reproductive toxicity	:	Delayed skeletal formation, significant increase of incidence of abnormality in urinary system in pups of 500 mg/m ³ group in an inhalation exposure study in the Rat during days 6-15 of pregnancy (NITE, Initial Risk Assessment of the Chemical Substances) Increase of the embryonic digestibility, delayed skeletal formation were noted in pups of 600 mg/m ³ group, and Increase of the supernumerary rib and others were noted in pups of 2400 mg/m ³ group, in an inhalation exposure study in the Rat during days 6-15 of pregnancy
Specific target organ toxicity -single exposure	:	Lacrimation, decreased respiration, effect to central nervous system were noted in an inhalation exposure study in the Mouse (1430 – 8000 ppm) (NITE, Initial Risk Assessment of the Chemical Substances). Pain in eye and nose, chest constriction, dizziness were noted in exposure case of human at 2000 ppm (ACGIH).
Specific target organ toxicity -repeated exposure	:	Cloudy swelling of hepatocyte and epithelium cell were noted in the groups of 408 mg/kg/day and above in 6-months oral toxicity study (NITE, Initial Risk Assessment of the Chemical Substances). Increase of syncytium cell in liver was noted at 75 ppm in 103-weeks inhalation exposure study in the Mouse. Hyperplasia of follicular cell of thyroid gland, metaplasia of alveolar epithelium cell, increased incidence of hypertrophy of hepatocyte were noted at 750 ppm. LOAEL is 75 ppm (NITE, Initial Risk Assessment of the Chemical Substances).
Aspiration hazard	:	Chemical pneumonia may be caused by accidental ingestion (ICSC).

Toxicological information of Amorphous Silica B

Acute toxicity (oral)	:	Rat, LD50 > 3300 mg/kg, > 5000 mg/kg (SIDS)
Acute toxicity (dermal)	:	Rabbit, LD50 > 2000 mg/kg (SIDS)
Acute toxicity (inhalation: dust)	:	Rat, LC50 > 2.08 mg/L/4hr (SIDS)
Skin corrosion / irritation	:	Irritation was not noted in a skin irritation study using the Rabbit. (SIDS)
Serious eye damage / irritation	:	Irritation was not noted in an eye irritation study using the Rabbit (SIDS)
Skin sensitization	:	Sensitization property was not observed in a skin sensitization study (GPMT) using the Guinea-pig (IUCLID).
Respiratory sensitization	:	No information.
Germ cell mutagenicity	:	Negative in the observation of bone marrow in chromosome aberration test in vivo by single or repeated oral administration in the Rat and dominant lethal test. (SIDS) Negative in chromosome aberration test using Chinese hamster ovary cell and HGPRT gene mutation test. (SIDS)
Carcinogenicity	:	Carcinogenicity classification of IARC: Group 3 (not classifiable as to its carcinogenicity to humans) Difference was not noted in the incidence of tumor in 103-week dietary administration study in the Rat and 93-week dietary administration study in the Mouse. (SIDS) In a Mouse inhalation exposure to precipitated silica for 1 year, difference was noted in survival rate, incident of pulmonary tumor, etc., after whole-life observation. (HSDB)
Reproductive toxicity	:	Effect to reproduction was not noted in one-generation reproductive toxicity study in the Rat at 500 mg/kg by dietary administration for 4.5 months before mating, 6 months after mating. (SIDS) Maternal toxicity, fetotoxicity and developmental toxicity were not noted in the studies using Rat, Mouse, Rabbit and hamster. (SIDS)
Specific target organ toxicity -single exposure	:	Irritation and breathing difficulty were noted in 1-hour inhalation exposure study in the Rat (concentration: 2.2 mg/L). (IUCLID)
Specific target organ toxicity -repeated exposure	:	Silicosis and other lung disease were not noted in workers who were involved in manufacturing and handling of precipitate amorphous silica. (SIDS) Inflammation reaction, etc., were noted in a 13-weeks inhalation exposure study in the Rat. Mild change was noted in 1.3 mg/m ³ treated group and the symptom recovered quickly. Focal interstitial pneumonia was observed after the end of exposure period in the groups treated with 5.9 mg/m ³ and above. (SIDS)
Aspiration hazard	:	No information.

Toxicological information of Xylene

- Acute toxicity (oral) : Oral, Rat LD50 = 3500 – 8640 mg/kg Oral, Mouse LD50 = 5300, 5600 mg/kg (NITE, Initial Risk Assessment of the Chemical Substances).
- Acute toxicity (dermal) : Dermal, Rabbit LD50 > 114 mg/kg (NITE, Initial Risk Assessment of the Chemical Substances). Dermal, Rabbit LD50 = 4300 mg/kg (ACGIH, SIDS)
- Acute toxicity (inhalation:vapour) : Inhalation, vapour, Rat LD50 = 6400 – 6700 ppm/4hr (NITE, Initial Risk Assessment of the Chemical Substances).
- Skin corrosion / irritation : Moderate to severe irritation was noted in skin irritation study using the Mouse, Guinea-pig and Rabbit (NITE, Initial Risk Assessment of the Chemical Substances). Erythema and anasarca were noted in single skin irritation test using the Guinea-pig and Rabbit, and then resulted in desquamation and necrosis.
- Serious eye damage / irritation : Mild to moderate irritation was noted in an instillation study in Rabbit eye (NITE, Initial Risk Assessment of the Chemical Substances). Mild to moderate irritation was noted in an instillation study in Rabbit eye (Initial Risk Assessment of the Chemical Substances).
- Skin sensitization : Skin sensitization: skin sensitization was not noted in an experiment on 24 volunteers (NITE, Initial Risk Assessment of the Chemical Substances).
- Respiratory sensitization : Respiratory sensitization: no data.
- Germ cell mutagenicity : Negative in micronucleus test in vivo by intraperitoneal administration in the Mouse (NITE, Initial Risk Assessment of the Chemical Substances).
Negative as the result of observation of bone marrow cell in chromosome aberration study in vivo using the Rat by inhalation exposure for 9-18 weeks (NITE, Initial Risk Assessment of the Chemical Substances).
Negative in Ames test using Salmonella typhimurium and Escherichia coli. (Initial Risk Assessment of the Chemical Substances)
Negative in chromosome aberration study in vitro using human lymphocyte and CHO cell, and sister chromatid exchange assay (NITE, Initial Risk Assessment of the Chemical Substances).
- Carcinogenicity : Carcinogenicity classification of IARC: 3 (not classifiable as a human carcinogen)
Carcinogenicity classification of ACGIH: A4 (not classifiable as a human carcinogen)
- Reproductive toxicity : No clear effect was noted in maternal animal treated at 2.06 mg/kg/day and above but increase of malformation such as cleft palate was noted in their fetus in an oral administration study in female Mouse during days 6-15 of pregnancy (NITE, Initial Risk Assessment of the Chemical Substances, Environmental Risk Assessment of the Chemical Substances).
No effect was noted in maternal animal but delayed ossification of maxilla in fetus, ataxia in offspring were noted in an inhalation exposure study in female Rat during days 4-20 of pregnancy (NITE, Initial Risk Assessment of the Chemical Substances, Environmental Risk Assessment of the Chemical Substances).
Increase of resorption, delayed ossification, increase of skeletal variation were noted in fetus in an inhalation exposure study in female Rat during days 1-21 of pregnancy (NITE, Initial Risk Assessment of the Chemical Substances).
- Specific target organ toxicity -single exposure : Central nervous toxicity was noted in oral administration in the Rat (NITE, Initial Risk Assessment of the Chemical Substances).
Coma, acute pulmonary edema, damage in liver and hematemesis were noted in human after ingestion of industrial xylene (NITE, Initial Risk Assessment of the Chemical Substances).
Severe pulmonary congestion, alveolar hemorrhage, pulmonary edema, congestion accompanied with swelling of liver, centrilobular vacuolization of hepatocyte were noted in the workers after exposed to xylene for several hours.
Hepatic disorder, severe renal disorder and loss of memory were also noted (NITE, Initial Risk Assessment of the Chemical Substances).
Inhalation of vapour at high concentration causes excited state followed by narcotic condition and death may result (NITE, Initial Risk Assessment of the Chemical Substances).
Severe respiratory disorder was seen ten minutes later from hitting intravenous injection of dimethylbenzene in a suicidal object in human
- Specific target organ toxicity -repeated exposure : Chronic encephalalgia, chest pain, an electroencephalographic aberration, dyspnea, cyanosis of the hand, number of leukocyte decrease, a lung function reduction and mental disorder were noted in human by exposure of toluene for 1.5-18 years

Gasping, pulmonary functional disorder were noted as the result of chronic exposure to xylene (NITE, Initial Risk Assessment of the Chemical Substances).

Increase of eye, nose and throat irritation, subjective symptoms by central nervous system (restless, forgetfulness, inattention) were noted in the workers after exposed to xylene for 7 years (Risk Assessment by Ministry of the Environment).

Aspiration hazard : Chemical pneumonia may be caused by accidental ingestion of o-, m-, p-xylene (ICSC).

Toxicological information of Ethyl alcohol

- Acute toxicity (oral) : Rat, LD50 = 7000 - 11000 mg/kg (SIDS), Mouse, LD50 = 8300 mg/kg (SIDS)
- Acute toxicity (dermal) : Rabbit, LDLo = 20000 mg/kg (SIDS)
- Acute toxicity (inhalation:vapour) : Rat, LC50 = 63000 ppmV/4hr (DFGMAK), 124.7 mg/L/4hr (SIDS), LCLo > 29.43 mg/L/7hr (SIDS)
- Skin corrosion / irritation : Not irritant in skin irritation study using the Rabbit (SIDS).
- Serious eye damage / irritation : Moderate irritant in eye irritation study using the Rabbit (SIDS).
Corneal opacity, chemosis and etc., were observed until 3 days after instillation in eye irritation study using the Rabbit, but the symptoms almost recovered within 7 days (ECETOC).
- Skin sensitization : Cases of contact dermatitis due to alcohol allergy reaction and etc., in human are reported (DFGMAK).
No sufficient data to show skin sensitising potential of ethanol is available (ACGIH, DFGMAK).
Not skin sensitiser in skin sensitisation study using the Guinea-pig and Mouse (IUCLID).
- Respiratory sensitization : Severe bronchoconstriction was caused in mild asthma patients in inhalation induction study, but it was not considered to be due to allergy (DFGMAK).
- Germ cell mutagenicity : Positive in oral dose administration dominant lethal mutation test using the Rat and Mouse (SIDS, IARC).
Negative as the result of observation of bone marrow in in vivo chromosome aberration study and micronucleus assay by drinking-water administration to the Rat (SIDS, IARC).
- Carcinogenicity : Carcinogenicity classification of IARC: Group 1 (carcinogenic to humans) (alcoholic drink)
Carcinogenicity classification of ACGIH: A3 (confirmed animal carcinogen with unknown relevance to humans)
- Reproductive toxicity : Drinking more than certain amounts of alcohol significantly increases the incidence and risk of abortion (IARC).
Polydactyly, polysyndactyly and such malformation were noted in the Rat in oral administration during gestation (IARC).
Fetal alcohol syndrome that induces microcephaly and mental disorder in unborn child was noted in habitual alcohol drinking by pregnant woman (IARC, SIDS).
Cleft palate, atrial septal defect, ventricular septal and etc., are noted due to intake of ethanol by pregnant woman before delivery.
Intake of large amount indicates teratogenicity and fetotoxicity (SIDS).
- Specific target organ toxicity -single exposure : Stupor, drowsiness, mild paralysis were observed in inhalation exposure study in human (ACGIH).
Irritation to eye and upper respiratory tract was observed in human even at the low concentration in inhalation exposure to vapour (ACGIH).
Amyotaxia, blurred vision, stupor, nausea, convulsion, respiratory depression were observed in severe poisoning in human. Death is caused as the result of respiratory or circulatory disturbance or aspiration of gastric contents (Patty).
- Specific target organ toxicity -repeated exposure : Intake of large amounts for a long time causes damage to most of the organs and the most adversely affected target organ is liver.
Fatty liver, necrosis and etc., lead to cirrhosis (DFGMAK).
Hyperreflexia accompanied with muscle weakness, anxiety is significant in addition to tremor, convulsion and such withdrawal symptom in severe alcoholic patient (HSDB).
- Aspiration hazard : No information.

12. Ecological information**Ecological information of Product**

: No information about all of the items

Ecological information of Vinylester resin

: No information about all of the items

Ecological information of Styrene

- Ecological information : 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 Glass flake

: No information about all of the items

Ecological information of Titanium dioxide

- Ecotoxicity : Fish (Killifish), LC50(48hr) > 20 mg/L (Safety Assessment Data of Existing Chemical Substance), >12 Ti mg/L (Environmental Risk Assessment)
Crustacea (Daphnia magna), EC50(48hr), 165 Ti mg/L, > 599 Ti mg/L (Environmental Risk Assessment)
Algae (Green alga), EC50(72hr), 35.9 Ti mg/L, NOEC(72hr), 10.1 Ti mg/L (Environmental Risk Assessment)
- Persistence/degradability : No information
- Bioaccumulative potential : Judged to be low level of bioaccumulation in bioaccumulation study in accordance with the Japanese Chemical Substance Control Law. (Safety Assessment Data of Existing Chemical Substance)
- Mobility in soil : No information.
- Hazardous to the ozone layer : No information.

Ecological information of Inorganic filler

- Ecotoxicity : Fish (Zebra-fish), LC50(24hr) > 100 g/L (IUCLID, HSDB)
- Persistence/degradability : No information
- Bioaccumulative potential : No information
- Mobility in soil : No information.
- Hazardous to the ozone layer : No information.

Ecological information of Methyl methacrylate

- Ecotoxicity : Fish (Fathead minnow) LC50 (96hr) 130mg/L (NITE, Initial Risk Assessment of the Chemical Substances)
Crustacea (Daphnia magna) EC50 (48hr) 69mg/L (NITE, Initial Risk Assessment of the Chemical Substances)
Algae (Selenastrum) EbC50(96hr) 170mg/L (NITE, 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 : Bio-concentration factor BCF=2.3 (calculated value) (Initial Risk Assessment of the Chemical Substances)
Estimated as low level of bioaccumulation to an aquatic organism (Initial Risk Assessment of the Chemical Substances)

Mobility in soil : No information.
 Hazardous to the ozone layer : No information.

Ecological information of Amorphous silica A

: No information about all of the items

Ecological information of Cobalt naphthenate

: No information about all of the items

Ecological information of Ethylbenzene

Ecotoxicity : Fish (Rainbow trout), LC50 (96hr) = 4.2 mg/L (NITE, Initial Risk Assessment of the Chemical Substances).
 Fish (Fathead minnow), LC50 (96hr) = 12.1 mg/L (NITE, Initial Risk Assessment of the Chemical Substances).
 Crustacea (Daphnia magna), LC50 (48hr) = 1.8 - 2.9 mg/L (NITE, Initial Risk Assessment of the Chemical Substances).
 Algal (Green alga), EC50 (72hr) = 4.6 mg/L (NITE, Initial Risk Assessment of the Chemical Substances)

Persistence/degradability : Concluded to be readily biodegradable in 4-weeks biodegradation study according to CSCL (Safety Assessment Data of Existing Chemical Substance).

Bioaccumulative potential : Octanol/water partition coefficient: log Pow = 3.15 (measured value) (NITE, Initial Risk Assessment of the Chemical Substances).

Mobility in soil : Soil absorption/desorption coefficient: Koc = 164 (NITE, Initial Risk Assessment of the Chemical Substances).

Hazardous to the ozone layer : No information.

Ecological information of Amorphous silica B

Ecotoxicity : Fish (Carp) LC50 (72hr) >10000 mg/L (HSDB)
 : Fish (Zebra fish) LC0 (96hr) 10000 mg/L (SIDS)
 : Crustacea (Daphnia magna) EC50 (24hr) >10000 mg/L (SIDS)
 : Algae NOEC (72hr) 10000mg/L (SIDS), 60mg/L (IUCLID)

Persistence/degradability : No information.

Bioaccumulative potential : No information.

Mobility in soil : No information.

Hazardous to the ozone layer : No information.

Ecological information of Xylene

Eco toxicity : Fish (Fathead minnow) LC50(96hr) 26.7mg/L(Initial Risk Assessment of the Chemical Substances)
 : Fish (Rainbow trout), LC50 (96hr) = 3.3 mg/L
 : Crustacea (Daphnia magna), EC50 (24hr) = 75 mg/L
 : Algal (Selenastrum), ErC50 (14day) = 72 mg/L, NOErC (24-72hr) = 9.2 mg/L (NITE, Initial Risk Assessment of the Chemical Substances).

Persistence/degradability : Concluded to be readily biodegradable in 2-weeks biodegradation study (Environmental Risk Assessment)

Bioaccumulative potential : Bio-concentration factor (BCF) is 6.2 – 21 (Environmental Risk Assessment)
 : Octanol/water partition coefficient: log Pow=3.12~3.20(measured value: Each isomer) (Initial Risk Assessment of the Chemical Substances)

Mobility in soil : Soil absorption/desorption coefficient: Koc = 39 – 2600 (measured value) (NITE, Initial Risk Assessment of the Chemical Substances).

Hazardous to the ozone layer : No information.

Ecological information of Amorphous Ethyl alcohol

Ecotoxicity : Fish (Fathead minnow) LC50 (96hr) > 100 mg/L (SIDS)
 Crustacea (cerioDaphnia quadrangular) LC50 (48hr) = 5012 mg/L (SIDS)
 Algae (Chlorella) EC50 (96hr) = 1000 mg/L (SIDS)

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 : No information.

Mobility in soil : No information.

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) : 1866
- Class (ADR) : 3
- Proper Shipping Name (ADR) : RESIN SOLUTION flammable
- Packing group (UN) : III

Domestic regulations

- Precautions for transport : Based on relevant regulations in section 15, transport this product.

Other information

- ERG No : 128
- : Load containers without turnover, drop and friction. Take measure certainly to prevent containers from collapsing. Check if there are no leaks. Keep containers tightly closed.

15. Regulatory information

- Japanese Pollutant Release and Transfer Register Law (PRTR Law) : Class 1 Designated Chemical Substances (Act Art.2 para. 2, Enforcement Order Art.1 Appended Table No.1)
Styrene (26%)
Methyl methacrylate (1.4%)
- 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)
Ethylbenzene
Styrene
Xylene
Dangerous and Harmful Substances Subject to Indicate Their Names (Law Art.57, Enforcement Order Art.18)
Xylene
Cobalt and the compounds
Titanium oxide (IV)
Silica
Styrene
Methyl methacrylate
Ethyl alcohol
Ethylbenzene
Dangerous and Harmful Substances Subject to Notify Their Names (Law Art.57-2, Enforcement Order Art.18-2 Attached Table No.9, and Law Art.56-1)
Xylene
Cobalt and the compounds
Titanium oxide
Silica

		Styrene
		Methyl methacrylate
		Ethyl alcohol
		Ethylbenzene
		Dangerous Substances - Flammable Substance (Enforcement Order Attached Table 1 Item 4)
		Ethylbenzene
		Styrene
		Xylene
		Ethyl alcohol
		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)
		Ethylbenzene
		Styrene
		Xylene
Water Pollution Prevention Law	:	Designated Materials (Article 2, Paragraph 4 of the Law, Article 3-3 of the Enforcement Order)
		Styrene
		Xylene
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
		Xylene
Air Pollution Control Law	:	Hazardous Air Pollutants (Central Environment Council Report No. 9)
		Ethylbenzene
		Styrene
		Xylene
		Cobalt naphthenate
		Methyl methacrylate
		Methacrylic acid
		Volatile Organic Compounds (Law Art.2 Para.4) (MOE Official Notice to Prefectures)
		Ethylbenzene
		Styrene
		Xylene
		Ethyl alcohol
		Methyl methacrylate
Law Relating to Prevention of Marine Pollution and Maritime Disasters	:	Flammable Substances (Law Art.3,(6)-2, Enforcement Order, Art.1-7, Attached Table No.1-4)
		Ethylbenzene
		Styrene
		Xylene
		Non deleterious substance (Enforcement Order, Attached Table No.1-2)
		Silica(Amorphia)
		Noxious Liquid Substances - Category Y (Law Art.3(3), Enforcement Order, Art.1-2, Attached Table No.1 Item 2)
		Ethylbenzene
		Styrene
		Xylene
		Methyl methacrylate
		Noxious Liquid Substances - Category Z (Law Art.3(3), Enforcement Order, Art.1-2, Attached Table No.1 Item 3)
		Titanium oxide

	Ethyl alcohol	
Ship Safety Act	:	Flammable liquids
Civil Aeronautics Law	:	Flammable liquids
Port Regulation Law	:	Flammable liquids
Road Act	:	Restriction for Vehicle Traffic (Enforcement Order Art.19-13, Publication of Japan Highway Public 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) Ethylbenzene Styrene Xylene Methyl methacrylate
High Pressure Gas Safety Act	:	Combustible gas (Security Regulation for General High- Pressure Gas Art.2-1) Ethylbenzene Toxic gas (Security Regulation for General High- Pressure Gas Art.2-2) Ethylbenzene
Labor Standards Act	:	Chemical Substances Causing Occupational Illnesses (Act Art.75, Para.2, Ordinance Attached Table 1-2, Item 4-1,MHLW Nortification No.36 of 1978 Styrene Xylene Cobalt naphthenate Methyl methacrylate Sensitizing potential substances ((Act Art.75, Para.2, Ordinance Attached Table 1-2, Item 4,MHLW) Methyl methacrylate
Pneumoconiosis Act.	:	Attached table”Dust work (Act Art.2, enforcement regulations Art.2) Titanium oxide Silica(Amorphia)

16. Other information

Name	TSCA	EC No	IECSC
Vinylester resin	Listed	Not applicable	Listed
Styrene	Listed	202-851-5	Listed
Glass flake	Not listed	Listed	Not listed
Titanium dioxide	Listed	236-675-5	Listed
Inorganic filler	Listed	Listed	Listed
Methyl methacrylate	Listed	201-297-1	Listed
Amorphous silica A	Listed	614-122-2	Listed
Cobalt naphthenate	Listed	263-064-0	Listed
Ethylbenzene	Listed	202-849-4	Listed
Amorphous silica B	Listed	231-545-4	Listed
Xylene	Listed	215-535-7	Listed
Ethyl alcohol	Listed	200-578-6	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.

