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· **Product Identifier**
· **Trade Name:** SEC1244 B
· **Application of the Substance or Mixture:** Epoxy Hardener

· **Details of the Supplier of the Safety Data Sheet (SDS)**
· **Manufacturer or Supplier:**
Resinlab, LLC
N109 W13300 Ellsworth Drive,
Germantown, WI 53022
1-800-388-8605
www.resinlab.com
· **Information Department:** Product Safety Department: msds@resinlab.com
· **Emergency Telephone Number:**
North America - Chemtrec: 1-800-424-9300 (24 hours)
International - Chemtrec: 01-703-527-3887 (24 hours)

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2 Hazard(s) identification

· **Hazard Classification**

GHS08 Health hazard

Resp. Sens. 1 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

GHS05 Corrosion

Eye Dam. 1 H318 Causes serious eye damage.

GHS09 Environment

Aquatic Chronic 1 H410 Very toxic to aquatic life with long lasting effects.

GHS07

Skin Sens. 1 H317 May cause an allergic skin reaction.

· **Label Elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Pictogram(s)**

GHS05 GHS08 GHS09

· **Signal Word** Danger

· **Hazard-determining Component(s)**
Silver
4-Methyltetrahydrophthalic anhydride
Phthalic anhydride
· **Hazard statements**
Causes serious eye damage.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
Very toxic to aquatic life with long lasting effects.

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· **Precautionary statements**
Wear respiratory protection.
Avoid breathing dust/fume/gas/mist/vapors/spray
Wear protective gloves.
Wear eye protection / face protection.
Avoid release to the environment.
Contaminated work clothing must not be allowed out of the workplace.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a poison center/doctor.
Specific treatment (see on this label).
If experiencing respiratory symptoms: Call a poison center/doctor.
Wash contaminated clothing before reuse.
If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
If skin irritation or rash occurs: Get medical advice/attention.
If on skin: Wash with plenty of water.
Collect spillage.
Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Prevention**
In case of inadequate ventilation wear respiratory protection.
Avoid breathing dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection.
Avoid release to the environment.
Contaminated work clothing must not be allowed out of the workplace.

· **Disposal** Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Hazard Rating System**
· **NFPA System**
· **NFPA Ratings (scale 0 - 4)**

Health = 3
Fire = 1
Reactivity = 0

NFPA special hazards (water reactivity and oxidizing property): None

· **HMIS System**
· **HMIS Ratings (scale 0 - 4)**

HEALTH	*3
FIRE	1
REACTIVITY	0

Health = *3
Fire = 1
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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3 Composition/information on ingredients

· **Chemical Characterization: Mixtures**

· **Composition/Information on Ingredients**

CAS: 7440-22-4 EINECS: 231-131-3	Silver Aquatic Chronic 1, H410	80-90%

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CAS: 34090-76-1 EINECS: 251-823-9 Index Number: 607-240-00-0	4-Methyltetrahydrophthalic anhydride Resp. Sens. 1, H334 Eye Dam. 1, H318 Skin Sens. 1, H317	5-<10%
CAS: 85-43-8 EINECS: 201-605-4 Index Number: 607-099-00-5	1,2,3,6-tetrahydrophthalic anhydride Resp. Sens. 1, H334 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Chronic 3, H412	2.5-5%
CAS: 19438-60-9 EINECS: 243-072-0 Index Number: 607-241-00-6	hexahydro-4-methylphthalic anhydride Resp. Sens. 1, H334 Eye Dam. 1, H318 Skin Sens. 1, H317	2.5-5%
CAS: 85-44-9 EINECS: 201-607-5 Index Number: 607-009-00-4 RTECS: TI 3150000	Phthalic anhydride Resp. Sens. 1, H334 Eye Dam. 1, H318 Acute Tox. 4, H302; Skin Irrit. 2, H315; Skin Sens. 1, H317; STOT SE 3, H335	0.1-<1%

· **Classification System:**
The Classifications were based on the Toxicological and Ecological Data of the substances/mixtures in the Section 11 and 12.

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4 First-aid measures

· **Description of First Aid Measures**

· **General Information**
Ensure medical personnel are aware of exposure and take precautions for their personal protection; see Section 8 for the information of personal protection.

· **After Inhalation**
Remove victim from exposure to fresh air. Keep person at rest. Provide oxygen if person is not breathing.
Supply fresh air and to be sure call for a doctor.
In case of unconsciousness place patient stably in side position for transportation.
If breathing is difficult, administer oxygen.
Seek immediate medical advice.

· **After Skin Contact**
Gently wash contaminated skin with water.
Remove all contaminated clothing and wash before reuse.
Seek medical treatment in case of complaints.

· **After Eye Contact**
Immediately rinse opened eyes for at least 15 minutes under running water.
Immediately remove contact lenses if present. Continue rinsing.
Do not put any ointments, oils or medication in eyes without specific instructions.
IMMEDIATELY transport victim to a hospital even if no symptoms develop.

· **After Swallowing**
If victim is unconscious; never give anything by mouth.
If victim is conscious; rinse out mouth and give victim small amounts of water.
Seek medical treatment in case of complaints.

· **After Exposure** Get medical advice/attention at once.

· **Information for Doctor** Have chemical containers, labels and/or (M)SDS ready when calling or visiting a medical center.

· **Indication of any Immediate Medical Attention and Special Treatment Needed**
After frequent or high intense exposure, the following medical tests are recommended:
Skin, Eye, and Respiratory system test
Check section 11 Toxicological Information for further relevant information.

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· **Additional Information**
For additional information, please consult the corresponding first aid measures in the most current version of Emergency Response Guidebook which is produced by the US Department of Transportation.

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5 Fire-fighting measures

· **Extinguishing Media**
· **Suitable Extinguishing Agent(s)**
Use fire fighting measures and extinguishing agents that suit the environment.
In case of fire, suitable extinguishing agents are:
Alcohol resistant foam.
Dry chemical or fire-extinguishing powder.
Carbon dioxide (CO_2).
Water spray or water fog.
· **Unsuitable Extinguishing Agent(s)** No relevant information.

· **Firefighting Procedures**
Isolate fire and deny unnecessary entry.
Eliminate all ignition sources if safe to do so.
Do not extinguish fire unless flow can be stopped.
Fight fire remotely due to the risk of explosion.
Burning liquids may be moved by flushing with water; protect personnel and minimize property damage.
Contain fire water runoff if possible to prevent environmental pollution.
Fight fire from protected location or safe distance.
Contain fire water runoff if possible to prevent environmental pollution.

· **Special Hazards Arising in Fire**
Will not burn unless preheated.
In case of fire, following can be released:
Nitrogen oxides
Carbon dioxide (CO_2) and Carbon monoxide (CO)
Phthalic acids
Silver (Ag) dust

· **Advice for Firefighters**
If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA fire brigades standard (29 CFR 1910.156).
As with any fire, wear positive-pressure self-contained breathing apparatus and full protective gear that are NIOSH approved.

· **Additional Information** Ensure adequate and functional fire fighting facilities equipped in working area at all times.

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6 Accidental release measures

· **Personal Precautions**
Do not breathe gas, vapors, dusts or mists if their inhalable particles occur during use.
Ensure personnel take precautions for their personal protection during clean up; see Section 8 for the specific requirements.

· **Environmental Precautions**
Keep away from sewage system or other water courses; do not penetrate ground/soil.
Inform respective authorities in case of any seepage to the environment.

· **Cleaning Up Methods**
Ensure adequate ventilation.
Eliminate all ignition sources.
Keep unauthorized personnel away.
For large spills:
Shut off source of leak if safe to do so.
Dike and contain.
Remove with vacuum trucks or pump to storage/salvage vessels.
Allow molten product to cool.
Absorb residues with liquid-binding materials.

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For small spills:
Ventilate and wash area after clean-up is complete.
Collect spills in suitable and properly labeled containers.
Do not use solvents unless following safe handling practices and within the recommended exposure guidelines.
Dispose contaminated chemicals as waste according to Section 13.

· **Additional Information** *No further relevant information.*

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7 Handling and storage

· **Handling**
· **Precautions for Safe Handling**
Obtain special instruction before use; do not handle until all safety precautions have been read and understood.
Do not breathe gas, vapors, dusts or mists if their inhalable particles occur during handling.
Avoid any body contact of containers or contents unless wearing appropriate personal protective equipment.
Wear respiratory protection when handling.
Keep away from incompatible material(s).
Avoid any release into the environment.
Observe all the personal protection requirements in Section 8.
· **Information about Protection Against Explosions and Fires**
Will not burn unless preheated.
Keep away from heat, sparks, open flame and other ignition sources during handling.

· **Storage**
· **Requirements to be Met by Storerooms and Receptacles**
Store in a well-ventilated place; provide ventilation for receptacles.
Keep stored in accordance with local, regional, national, and international regulations.
· **Information about Storage in One Common Storage Facility**
Store away from incompatible material(s).
Store away from foodstuffs.
Avoid release to the environment.

· **Additional Information** *No further relevant information.*

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8 Exposure controls/personal protection

· **Engineering Measures or Controls**
· **Exposure Limit Values that Require Monitoring at the Workplace**
The substance/mixture does not contain any relevant quantities of substances with critical values that have to be monitored at the workplace.

· **Additional Information for the Limit Values**
Due to the wetted form, limit values for the dust and/or aerosol form are not required.
Local exhaust must be used to maintain airborne levels below recommended exposure limits where there are inadequately ventilated environments, and/or when the mixture is heated, sprayed, or aerosolized.

· **Personal Protective**
· **General Protective and Hygienic Measures**
Avoid any contact with skin or eye.
Do not eat, drink or smoke during work.
Keep food, drink or feed away from working area.
Contaminated work clothing is not allowed out of workplace.
Avoid contact with eyes.
Clean hands and exposed skin thoroughly after work and before breaks.

· **Personal Protective Equipment (PPE)**
· **Breathing Equipment**
Due to the wetted form, no breathing equipment is required.
Respirator protection must be worn in cases where there are inadequately ventilated environments, and/or when the mixture is heated, sprayed, or aerosolized.

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· **Hand Protection**

Protective gloves

Selection of glove material should take into consideration the penetration times, rates of diffusion, and the degradation.
Suggested glove type(s):
Nitrile Gloves
Butyl Rubber Gloves

· **Eye Protection**

Brief or short term use: Tightly sealed goggles

Intensive or long term use: Tightly sealed goggles and Face Shields

· **Body Protection** No relevant information.

· **Additional Information**
All protective clothing (suits, gloves, footwear, headgear) should be clean, available every day, and put on before work.
The Engineering measures or controls, and PPE recommendations are only guidelines and may not apply to every situation. For additional information, please consult the corresponding requirements under OSHA 29 CFR 1910.94-95, and 29 CFR 1910.132-138.

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9 Physical and chemical properties

· **Information on Basic Physical and Chemical Properties**

· **Appearance:**	
· **Form:**	Liquid
· **Color:**	Silver-colored
· **Odor:**	Aromatic
· **Odor Threshold:**	Not determined.
· **PH-Value at 20 °C (68 °F):**	3.5
· **Change in Condition:**	
· **Melting Point:**	> 19.3 °C (> 67 °F)
· **Boiling Point:**	Not determined.
· **Flash Point:**	> 163 °C (> 325 °F)
· **Decomposition Temperature:**	Not determined.
· **Auto-ignition Temperature:**	> 415 °C (> 779 °F)
· **Flammability:**	Not determined.
· **Explosion:**	Not determined.
· **Explosion Limits:**	
· **Lower:**	Not determined.
· **Upper:**	Not determined.
· **Vapor Pressure at 25 °C (77 °F):**	< 3.05E-3 hPa
· **Vapor Density:**	not determined
· **Density at 20 °C (68 °F):**	4.33 g/cm³ (36.134 lbs/gal)

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· **Solubility in or Miscibility with**
· **Water:** Partially miscible.
· **Segregation coefficient LogPow (n-octanol/ water):** Not determined.
· **Viscosity:**
· **Dynamic:** Not determined.
· **Kinematic:** Not determined.

· **Additional Information** No further relevant information.

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10 Stability and reactivity

· **Physical Hazard(s)** Not a regulated reactive or physical hazard under GHS.

· **Hazardous Reactivity and Chemical Stability** May slowly react with water or moisture.

· **Thermal Decomposition and Conditions to be Avoided**
Keep away from incompatible material(s).
Thermally decomposes during fire or high heat; keep away from heat, sparks, open flame and other ignition sources.

· **Possibility of Other Hazardous Reaction(s)** No further relevant information available.

· **Incompatible Material(s)**
Acid chlorides
Acid anhydrides
Acetylene, Oxidizing agents, Strong acids, Reducing agents, Alcohols
Bromoazides; Ethyleneimine (Aziridine); Hydrogen peroxide; Oxalic acid; Oxygen; and Tartaric acid

· **Hazardous Decomposition Product(s)**
Thermally decomposes during fire or very high heat. See Section 5 for fire hazards evolved during thermal decomposition.

· **Hazardous Polymerization Product(s)** No relevant information.

· **Additional Information** No further relevant information.

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11 Toxicological information

· **Acute Toxicity**

· **Oral**

7440-22-4 Silver		
Oral	LD50	3804 mg/kg (rat) (Read-across from silver(I) oxide; OECD TG 401) > 5000 mg/kg bw (rats) (Read-across from silver(I) sulfate; OECD TG 401) Reference: ECHA (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride		
Oral	LD50	(rat) (LD0 ≥ 2000; OECD TG 401; no death occurred) Reference: HPVIS (2011).
85-44-9 Phthalic anhydride		
Oral	LD50	1530 mg/kg (rat) (DMSO used as a solvent) Clinical signs at doses equal or higher than 500 mg/kg bw included sedation, imbalance, and bloodshot eyes. Reference: OECD SIDS (2005).

· **Potential Health Effect(s):**
If swallowed, may cause:
See acute inhalative effect(s) for further information

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· Dermal

7440-22-4 Silver		
Dermal	LD50	> 2000 mg/kg (rat) (males; test guideline not available) Reference: NLM HSDB (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride		
Dermal	LD50	(rat) (> 2000; limit test) Reference: HPVIS (2011).
85-44-9 Phthalic anhydride		
Dermal	LD50	(No data available)

· Potential Health Effect(s):
No further relevant information available; classification is not possible.
See acute inhalative effect(s) for further information.

· Inhalative

7440-22-4 Silver		
Inhalative	LC50/4 h	(Test species: n/a) (Toxicity not anticipated as a wetted form) Due to wetted form of the substance, inhalative effects from dust form can be seen as negligible. Meanwhile, based on the acute oral toxicity test, it was expected that toxicity to mammals via inhalation of the substance was not a significant concern and also resulted in a low acute toxicity.
34090-76-1 4-Methyltetrahydrophthalic anhydride		
Inhalative	LC50/4 h	(No data available)
85-44-9 Phthalic anhydride		
Inhalative	LC50/4 h	>2.14 mg/l (rat) (LC0/1h) No deaths occurred; only sign of intoxication was lacrimation observed within 15 min after exposure. Classification of inhalative toxicity was not possible without further information. Reference: OECD SIDS (2005). method: according OECD 403 - ten healthy rats (5/sex) were exposed nose-only to a test atmosphere of phthalic anhydride of 2.14 mg/L (highest technically feasible concentration) for 4 hours. result: LC50 > 2.14 mg/L (aerosol) - following exposure, the clinical signs observed for the surviving animals included hypoactivity, abnormal respiration, reduced fecal volume, ocular discharge and facial and/or anogenital staining. However they recovered by Day 14. Although three animals lost weight by Day 7, all surviving animals gained body weight over the 14-day observation period. Gross necropsy of the decedent revealed discoloration of the lungs and liver. No gross abnormalities were noted for any of the euthanized animals when necropsied at the conclusion of the 14-day period.

· Potential Health Effect(s):
While not possible to classify the acute inhalative hazard due to missing data, the product may cause the following symptom(s):

· Skin Corrosion or Irritation

7440-22-4 Silver	
Corrosion/Irritation	not irritating (rabbit) (OECD TG 404; 0.5g substance in water; 4 hr-contact) Erythema: 0.33/4 (Max. 4; Mean score of all treated animals; Time point: 24+48 hrs); fully reversible within 72 hours. Edema: 0/4 (Max.4; Mean score of all treated animals; Time point: 24+48+72 hrs); the substance was therefore considered as non-irritating to rabbit skin. Reference: ECHA (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Corrosion/Irritation	(rabbit) (Directive 67/548/EEC; Read across from 25550-51-0) Score of 1 on a 10 point scale was observed; the substance was classified as slightly irritating (Category 3) to rabbit skin for safety reasons. Reference: HPVIS (2011).
85-44-9 Phthalic anhydride	
Corrosion/Irritation	moderately (rabbit) (OECD TG 404; neat substance; Semi-occlusive) Dermal irritation index (time point: 1, 24, 48, and 72 hrs): 1.21 (Max. score was not available) Reference: OECD SIDS (2005).

· **Potential Health Effect(s):** No further relevant information; classification is not possible.

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· Eye Serious Damage or Irritation

7440-22-4 Silver	
Damage/Irritation	not irritating (rabbit) (OECD TG 405; 100mg substance; 1sec-contact) No ocular effects were noted 24, 48 or 72 hours after treatment; the substance was therefore not classified as irritating to rabbit eyes. Reference: ECHA (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Damage/Irritation	serious damage (rabbit) (EC Directive 67/548/EEC) Score of 9 on a 10 point scale was observed; the substance was therefore classified as highly irritating (Category 1) to rabbit eyes. Reference: HPVIS (2011).
85-44-9 Phthalic anhydride	
Damage/Irritation	serious damage (rabbit) (50 mg neat substance; Observation time: 7 days) Cornea: 1/4 (Max. 4; time point: 1+24 hrs); fully reversible in 7 days. Iris: 1/2 (Max. 2; time point: 1 hour); fully reversible in 24 hours. lacrimation: 1/4 (Max. 4; time point: 1 hour); fully reversible in 24 hours. Conjunctiva, redness: 2/3 (Max. 3; time point: 1hr); not fully reversible during the 7 day observation period. (human) There were effects on human eyes including conjunctivitis, lacrimation, corneal ulceration, necrosis, and photophobia after occupational exposure to the substance. Although the substance could be classified into Category 1 or 2A in the absence of data on reversibility, it was placed in Category 1 (serious damage to eyes) for safety reasons. Reference: OECD SIDS (2005), GHS-J (2006), NIOSH (2012), and ECHA (2012).

· Potential Health Effect(s):
Causes serious eye damage.
In contact with eye, may cause:
decrease or loss of vision
redness, pain and severe deep burns

· Respiratory or Skin Sensitization

7440-22-4 Silver		
Sensitization	Skin	not sensitizing (guinea pig) (EPA OPPTS 870.2600; epicutaneous and occlusive) There were no positive reactions after dermal application with up to 50% of the substance in distilled water; the substance was not considered as a dermal sensitizer.
	Respiratory	(No data available)
34090-76-1 4-Methyltetrahydrophthalic anhydride		
Sensitization	Skin	sensitizing (Human) 23 out of 145 workers exposed to the substance showed skin-prick positive results (16%), and there was an association between exposure intensity and sensitizing case percentage. The authors concluded that the substance was a dermal sensitizer even at low levels of exposure.
	Respiratory	sensitizing (Human) 26 out of 145 workers exposed to the substance showed respiratory sensitization results (18%), and there was an association between exposure intensity and sensitizing case percentage. The authors concluded that the substance was a respiratory sensitizer even at low levels of exposure. Reference: HPVIS (2011).
85-44-9 Phthalic anhydride		
Sensitization	Skin	highly sens. (guinea pig) (OECD TG 406; intracutaneous and epicutaneous) 90% of the tested guinea pigs showed positive results in the skin sensitizing study. (mouse) (Mouse local lymphnode assay; dermal with up to 25% in acetone/olive oil) The estimated concentration of the substance that was required for a SI=3 value (the signal as being a sensitizer in the LLNA) was determined to be 0.357% which indicated an extremely sensitizing potential of the substance. Reference: OECD SIDS (2005).

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	Respiratory	positive (guinea pig) Animals exposed to and challenged with 5.0 mg/m³ of the substance dust had significant numbers of hemorrhagic lung foci. However, due to wetted form of the substance, inhalative effects can be seen as negligible. (human) Different sensitization reactions (asthma, rhinitis, and dermatitis) have been described in human epidemiological reports. Although in the absence of being a wetted form in the reports, the substance was classified as a respiratory (Category 1) sensitizer for safety reasons. Reference: OECD SIDS (2005) and HSDB (2011).

· **Potential Health Effect(s):**
May cause an allergic skin reaction.
Repeated skin contact may cause dermatitis, skin rash or itchiness.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

· **Germ Cell Mutagenicity**

7440-22-4 Silver	
Mutagenicity	negative (rat) (In Vivo (micronucleus assay; OECD TG 474)) In Vitro (Mammalian cell micronucleus test; OECD TG 487; Read-across from Silver Sulphate; human lymphocytes) - negative with and without metabolic activation. In Vitro (Mammalian cell gene mutation assay; OECD TG 476; Read-across from Silver Sulphate; mouse lymphoma L5178Y cells) - An increase in mutant frequency was observed without metabolic activation at the highest concentration; negative with metabolic activation, or without metabolic activation at other concentrations. In Vivo (micronucleus assay; OECD TG 474; Read-across from Silver nanoparticles; rats; oral with up to 1000 mg/kg bw/day) - negative; the substance did not affect either the frequency of micronucleated polychromatic erythrocytes, or the PCE/(PCE+NCE) ratio. When considering all of the evidence, the substance was not classified as mutagenic. Reference: ECHA (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Mutagenicity	negative (Test species listed below) In Vitro (Bacterial reverse mutation assay; S. typhimurium (TA 98, TA 100, TA 1535, and TA 1537) and E. coli WP2; OECD TG 471 and 472) - negative with and without metabolic activation In Vitro (Mammalian chromosome aberration test; Chinese Hamster Lung (CHL/IU) cells; OECD TG 473) - negative with and without metabolic activation Reference: HPVIS (2011).
85-44-9 Phthalic anhydride	
Mutagenicity	negative (Test species listed below) In Vitro (Ames test; Salmonella typhimurium TA 100, TA 1535, TA 98 and TA 1537, and Escherichia coli WP2uvrA; OECD TG 471 and 472) - negative with and without metabolic activation In Vitro (Sister chromatid exchange assay and Chromosome aberration test; Chinese hamster ovary cells) - negative with and without metabolic activation Reference: OECD SIDS (2005).

· **Potential Health Effect(s):** Not a known Germ Cell Mutagen.

· **Carcinogenicity**

7440-22-4 Silver	
Carcinogenicity	negative (Test species: n/a) (not listed as a Carcinogen by NTP, IARC or OSHA)
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Carcinogenicity	negative (Test species: n/a) Not listed as a carcinogen by IARC, NTP or ACGIH.
85-44-9 Phthalic anhydride	
Carcinogenicity	negative (rat) No evidence of carcinogenicity was seen in rats after exposure to approximately 1000 mg/kg bw/day of the substance, or in male and female mice after exposure to 4670, and 3430 mg/kg bw/day, respectively, in chronic (105-week) feeding studies. The substance was therefore not expected to pose any carcinogenic effects to humans. Reference: OECD SIDS (2005).

· **Potential Health Effect(s):** Not a known Carcinogen.

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· Reproductive Toxicity

7440-22-4 Silver	
Reproductive Toxi.	negative (rat) (OECD TG 414; Oral with up to 100 mg/kg/d) (Read-across from Silver (I) acetate;) NOAEL (Developmental toxicity) ≥ 100 mg/kg/day: no adverse effects. LOAEL (Maternal toxicity) = 30 mg/kg/day: weight loss. The substance was therefore not classified as a reproductive hazard. Reference: ECHA (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Reproductive Toxi.	negative (rat) (OECD TG 422; oral; up to 300 mg/kg/day; both sexes) NOEL (Reproductive toxicity, Developmental toxicities and Teratogenicity) = 300 mg/kg/day; no relevant adverse effects observed. The substance was not classified as a reproductive hazard.
85-44-9 Phthalic anhydride	
Reproductive Toxi.	N/A (Rats and Mice) - Reproductive toxicity study: NOAEL (rats; male and female; Parental generation; oral feed with up to 1000 mg/kg bw/day for 105 weeks) = 1000 mg/kg bw/d; there was no difference between the dosed and control groups. - Developmental toxicity study: NOAEL (Pregnant rats; maternal toxicity; oral with up to 3000 mg/kg bw/day) = 1000 mg/kg bw/day NOAEL (fetuses; both male and female; teratogenicity toxicity) = 1700 mg/kg bw/day. In the higher dose group, significant decreases in the weight of male fetuses and number of ossification center of the caudal vertebrae were found. However, ECHA concluded it as conclusive but not sufficient for the classification. Meanwhile, California 65 didn't list the substance as a reproductive hazard to humans. Classification was therefore not possible without further information. Reference: OECD SIDS (2005).

· **Potential Health Effect(s):** No further relevant information; classification is not possible.

· Specific Target Organ Toxicity - Single Exposure

7440-22-4 Silver	
STOT-Single	(No data available)
34090-76-1 4-Methyltetrahydrophthalic anhydride	
STOT-Single	N/A (rat) (OECD TG 401; Oral; single dose up to 2000 mg/kg bw) Hypoactivity, shortness of breath and prone position were noted at 2000 mg/kg after 1 day. At necropsy, thickening, inflammation, adhesions, and squamous metaplasia of forestomach were seen. However, ECHA concluded the results were conclusive but not sufficient for the classification. Reference: ECHA (2012).
85-44-9 Phthalic anhydride	
STOT-Single	(Human) (Respiratory irritant) There were human case reports that after initial exposure to the substance, it produced symptoms including coughing, sneezing, burning sensations in nose and throat, and increased mucous secretion. The substance was therefore consider as a respiratory irritant for safety reason. Reference: OECD SIDS (2005).

· **Potential Health Effect(s):**
No further relevant information; classification is not possible.
Some target organs may be exclusive due to low concentration of the hazardous component(s).

· Specific Target Organ Toxicity - Repeated Exposure

7440-22-4 Silver	
STOT-Repeated	(No data available) Target organ: N/A (Rat) NOAEL (Test substance: silver nanoparticles with median diameter of 56 nm; OECD TG 408; Oral with up to 500 mg/kg bw/day) = 30 mg/kg bw/day: target organs for the silver nanoparticles were found to be livers in both male and female rats; however, diameter of this substance was over 1μm based on the vendor's TDS. Thus, the NOAEL of 30 mg/kg bw/day can't be used for classification of target organ toxicity. Reference: ECHA (2011) and Technic TDS (2011).

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34090-76-1 4-Methyltetrahydrophthalic anhydride	
STOT-Repeated	(rat) (OECD TG 422; oral; up to 300 mg/kg/day; both sexes) Target organs: None NOEL (males) = 30 mg/kg bw/day: histopathological examination revealed squamous metaplasia of the forestomach at 100 mg/kg and above; however, this effect was systemic irrelevant. NOEL (females) = 100 mg/kg bw/day which was outside of the guidance value ranges. Reference: HPVIS (2011).
85-44-9 Phthalic anhydride	
STOT-Repeated	(Human) Target organs: None (Inhalation) 28 (24%) out of 118 workers exposed occasionally with 3-13 mg/m³ dust of the substance, which contained 40-46% as inspirable particles for 2 months or more, suffered from work-related rhinitis, 13 (11%) from chronic productive bronchitis, and 21 (28%) from work-associated asthma. However, due to wetted form of the substance, inhalative effects can be seen as negligible. (Rats and mice) Target organs: None (Oral) 1. LOAEL (rats; oral; up to 50000 ppm/day for 7 weeks) = 25000 ppm/day 2. NOAEL (rats; oral; up to 15000 ppm/day for 105 weeks) = 7500 ppm/day (500 mg/kg bw/day) 3. NOAEL (mice; oral; up to 50000 ppm/day for 7 weeks) = 50000 ppm/day (7140 mg/kg bw/day) However, effect dose levels for all three tests were outside of guidance value ranges. Reference: OECD SIDS (2005) and GHS-J (2007).

· **Potential Health Effect(s):** No further relevant information; classification is not possible.

· **Aspiration Hazard**	
7440-22-4 Silver	
Aspiration Hazard	(No data available)
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Aspiration Hazard	(No data available)
85-44-9 Phthalic anhydride	
Aspiration Hazard	(No data available)

· **Potential Health Effect(s):** No relevant information; classification is not possible.

· **Additional Information** No further relevant information.

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12 Ecological information

· **Aquatic Environmental Toxicity**	
7440-22-4 Silver	
Algae Toxicity	4.1E-4 mg/l (Pseudokirchneriella subcapitata) (EC10 (growth rate; 24 hrs)) 1.2 µg/l (Champia parvula) (NOEC (14 days); Silver element)
Crustacean Toxicity	2.2E-4 mg/l (Daphnia magna (water flea)) (LC50 (48 hrs); Read-across from AgNO3) 2.14 µg/L (Daphnia magna) (EC10 (21 days); ASTM standard method; Read-across from AgNO3) 2.48 µg/L (Ceriodaphnia dubia) (Read-across from AgNO3; EC10 (7 days); USEPA standard method)
Fish Toxicity	0.001- 0.01 mg/l (Pimephales promelas (fathead minnow)) (LC50 (96 hrs); EPA-821/R-02-012) LC50 (96 hrs) varies with age and size of fishes: 1.2 µg/l (1-4 day old fishes); 3.37 µg/l (7 day old fishes); 5.9 µg/l (27 day old fishes); 10.4 µg/l (41 day old fishes). 0.17 µg/l (Oncorhynchus mykiss) (Read-across from AgNO3; EC10 (196 days); OECD TG 210) 0.19 µg/l (Salmo trutta) (Read-across from AgNO3; EC10 (217 days); OECD TG 210) Based on the chronic EC10 < 0.1mg/l and the non-rapid degradability, the substance is classified as a chronic-1 environmental hazard. Reference: ECHA (2011).
34090-76-1 4-Methyltetrahydrophthalic anhydride	

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Algae Toxicity	(Read-across from CAS 11070-44-3) (Pseudokirchneriella subcapitata) (OECD TG 201) EC50 (biomass, 72hr) = 64 mg/l EC50 (growth rate, 24-72hr) = 68 mg/l Based on the acute EC50 < 100 mg/l, the substance is classified as an Acute-3 environmental hazard.
Crustacean Toxicity	(Read-across from CAS 11070-44-3) 130 mg/l (Daphnia magna (water flea)) (EC50 (48 hrs); OECD TG 202) 20 mg/L (NOEC (21 days; reproduction); OECD TG 211) Based on the non-rapid degradability and chronic NOEC > 10 mg/L, the substance is not classified as a chronic environmental hazard.
Fish Toxicity	(Read-across from CAS 11070-44-3) > 100 mg/l (Oryzias latipes (Rice fish)) (LC0 (96 hrs); OECD TG 203) 100 mg/l (NOEC (14 days; OECD TG 204) Reference: ECHA (2011).
85-44-9 Phthalic anhydride	
Algae Toxicity	(Desmodesmus subspicatus) ≥ 100 mg/l (EC0 (72 hrs); OECD TG 201; Test substance: Phthalic acid)
Crustacean Toxicity	(Daphnia magna (water flea)) 140 mg/l (EC50 (24 hrs); ISO 6341-15; Test substance: Phthalic acid) ≥ 640 mg/l (EC0 (48 hrs); EPA 660/3-75-009; Test substance: Phthalic acid)
Fish Toxicity	560 mg/l (Brachydanio rerio (Zebra fish)) (LC50 (7 days); OECD TG Draft "Early Life Stage") 10 mg/l (NOEC (60 days); OECD TG Draft "Early Life Stage") > 500 mg/l (Cyprinus carpio) (LC50 (48 hrs); Test substance: Phthalic acid) The substance is not expected to be toxic to marine organisms. Reference: OECD SIDS (2005).

· **Aquatic Environmental Toxicity Assessment:** Very toxic to aquatic life with long lasting effects.

· **Degradability and Stability**

7440-22-4 Silver	
Biodegradation	non-biodegrad. (Test species: n/a) (As a metal element, no degradation is possible)
Persistence	(Test species: n/a) (As a metal element, the substance is persistent) Reference: Canada DSL (2007).
Photodegradation	(Test species: n/a) (As a metal element, no degradation is possible)
Stability in water	stable (Test species: n/a) (As a metal element, it is stable in water)
34090-76-1 4-Methyltetrahydrophthalic anhydride	
Biodegradation	not biodegrad. (Test species: n/a) (OECD TG 301C; Chemical concentration: 100 mg/L) The substance rapidly and thoroughly hydrolyzed in contact with water; and its hydrolysates are not readily biodegradable. Reference: ECHA (2011).
Persistence	(Test species: n/a) The substance is not persistent. Reference: Canada DSL (2007).
Photodegradation	2.03E-11 cm³/molecule-sec (OH radical) Half-life (0.5E6 OH/cm³) = 18.98 hrs; however, photolysis is negligible in water. Reference: ECHA (2011).
Stability in water	(Test species: n/a) (OECD TG 111) The calculated half-lives at 20℃ for pH=4, 7, and 9 are all below 3.5 minutes. The substance rapidly and thoroughly hydrolyzed to the corresponding di-carboxylic acids which indicated a water-unstablility of the substance. Reference: ECHA (2011).
85-44-9 Phthalic anhydride	
Biodegradation	(Test species: n/a) (OECD TG 301C; Chemical Conc. 100 ppm; 2 weeks) Biodegradation (Direct analysis from TOC and UV-vis) = 93% and 96.4% Biodegradation (Indirect analysis from BOD) = 85.2% The substance is readily biodegradable. Reference: CHRIP (2011).

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Persistence	(Test species: n/a) The substance is not persistent. Reference: Canada DSL (2007).
Photodegradation	7.49E-14 cm³/molecule-sec (OH radical) (based on SRC-AOPWin v1.91, 2000) Half-life (5E5 OH/cm³; in air with sunlight) = 21 days Reference: OECD SIDS (2005).
Stability in water	hydrolyzable (Test species: n/a) (measured; at 25 °C) Half-life of hydrolysis (pH-values of 0 - 6) ≈ 70 seconds. Half-life (pH-values of 7.24 and 8.9) = 30.5 and 2.4 seconds respectively; thus, the substance is highly unstable in water and will hydrolyze to phthalic acid in a few seconds. Reference: OECD SIDS (2005).

· **Bioaccumulation and Distribution**

7440-22-4 Silver	
BCF	70 (Cyprinus carpio) (The substance is not bioaccumulative) Reference: ECHA (2011) and Canada DSL (2007).
Koc	(No data available)
LogPow	(Test species: n/a) (As a metal element, LogPow test is not applicable)
34090-76-1 4-Methyltetrahydrophthalic anhydride	
BCF	2.38 (Test species: n/a) (LogBCF; Calculated by BCFWIN) The substance is not bioaccumulative. Reference: Canada DSL (2007).
Koc	(No data available) Distribution to soil (80%) and water (19.9%) in environmental compartments has been calculated using a Fugacity model according to Mackay, Level III. Reference: ECHA (2011).
LogPow	1.88 (Test species: n/a) (OECD TG 117; at 40 °C; PH=5.9) Reference: ECHA (2011).
85-44-9 Phthalic anhydride	
BCF	3.4 (Test species: n/a) (SRC-BCFWIN v2.15; at 25 °C) The substance is not bioaccumulative. Reference: OECD SIDS (2005) and Canada DSL (2007).
Koc	11 L/kg (No data available) (Koc of the substance; PCKocWin v1.66) 73 L/kg (Koc of phthalic acid; PCKocWin v1.66) The Koc indicated both the substance and its hydrolysate have a low sorption potential on to organic phase of soil or sediments. Based on the model calculations (Mackay level I, v 2.11), the target compartment of the environmental distribution of the substance is hydrosphere (99.35 %). Reference: OECD SIDS (2005).
LogPow	1.6 (Test species: n/a) Reference: OECD SIDS (2005).

· **Degradability and Bioaccumulation Assessment:** Non-rapidly degradable, and low bioaccumulative.

· **Additional Information** No further relevant information.

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13 Disposal considerations

· **Hazardous Waste List**

· **Description:** Regulated as a hazardous waste for disposal.

· **RCRA Waste:**

7440-22-4	Silver	D011	80-90%
85-44-9	Phthalic anhydride	U190	0.1-<1%

· **Additional Information of the Hazardous Waste List**
Classification was according to the U.S. Federal Regulation: 40 CFR 261.

· **Waste Treatment Recommendation:**

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Generation of waste should be avoided or minimized wherever possible.
Chemical waste, even small quantities, is neither allowed to be poured down drains, sewage system or waterways; nor disposed with household garbage.
Dispose of contents/containers in accordance with local, regional, national, and international regulations.

· **Unused and Uncontaminated Packagings**
· **Recommendation** Dispose of according to your local waste regulations.

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14 Transport information

· **UN-Number**
· **DOT, ADR, IMDG, IATA** UN3082

· **UN Proper Shipping Name**
· **DOT, ADR, IMDG, IATA** Environmentally hazardous substances, liquid, n.o.s.(Epoxy hardener)

· **Transport hazard class(es)**

· **DOT, IMDG, IATA**

· **Class** 9 Miscellaneous dangerous substances and articles
· **Label** 9

· **ADR**

· **Class** 9 (M6) Miscellaneous dangerous substances and articles
· **Label** 9

· **Packing group**
· **DOT, ADR, IMDG, IATA** III

· **Environmental Hazards:**
· **Marine Pollutant:** Yes
Symbol (fish and tree)
· **Special Marking (ADR):** Symbol (fish and tree)
· **Special Marking (IATA):** Symbol (fish and tree)

· **Special Precautions:** Warning: Miscellaneous dangerous substances and articles
· **Danger Code (Kemler):** 90
· **EMS Number:** F-A,S-F

· **Transport in Bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

· **Transport/Additional Information:**

· **DOT**
· **Quantity limitations** On passenger aircraft/rail: No limit
On cargo aircraft only: No limit
· **Remarks:** Special marking with the symbol (fish and tree).

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· **ADR**
· **Excepted quantities (EQ)** Code: E1
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 1000 ml

· **IMDG**
· **Limited quantities (LQ)** 5L
· **Excepted quantities (EQ)** Code: E1
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 1000 ml

· **UN "Model Regulation":** UN3082, Environmentally hazardous substances, liquid, n.o.s.,(Epoxy hardener) 9, III

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15 Regulatory information

· **USA Regulation Lists**
· **SARA (Superfund Amendments and Reauthorization Act of 1986)**

· **Section 302 (Extremely Hazardous Substances)**

None of the ingredients is listed.

· **Section 313 (Toxics Release Inventory (TRI) reporting)**

7440-22-4	Silver	80-90%
85-44-9	Phthalic anhydride	0.1-<1%

· **Section 311/312 (Hazardous Chemical Inventory Reporting)**

931-36-2	2-ethyl-4-methylimidazole	A	0.1-<1%

· **Hazard Abbreviations for SARA 311/312**
A - Acute Health Hazard
C - Chronic Health Hazard
F - Fire Hazard
R - Reactive Hazard
S - Sudden Release of Pressure Hazard

· **TSCA (Toxic Substances Control Act)**

7440-22-4	Silver
34090-76-1	4-Methyltetrahydrophthalic anhydride
85-43-8	1,2,3,6-tetrahydrophthalic anhydride
19438-60-9	hexahydro-4-methylphthalic anhydride
85-44-9	Phthalic anhydride
931-36-2	2-ethyl-4-methylimidazole
822-36-6	4-methylimidazole
616-47-7	1-methylimidazole

· **Proposition 65**

· **Chemicals Known to Cause Cancer**

822-36-6	4-methylimidazole

· **Chemicals Known to Cause Reproductive Toxicity for Females**

None of the ingredients is listed.

· **Chemicals Known to Cause Reproductive Toxicity for Males**

None of the ingredients is listed.

· **Chemicals Known to Cause Developmental Toxicity**

None of the ingredients is listed.

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· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**

7440-22-4	Silver	D

· **IARC (International Agency for Research on Cancer)**

822-36-6	4-methylimidazole	2B

· **NTP (National Toxicology Program)**

None of the ingredients is listed.

· **TLV (Threshold Limit Value Established by ACGIH)**

85-44-9	Phthalic anhydride	A4

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients is listed.

· **International Regulation Lists**

· **Canadian Domestic Substance Listings:**

7440-22-4	Silver
34090-76-1	4-Methyltetrahydrophthalic anhydride
85-43-8	1,2,3,6-tetrahydrophthalic anhydride
19438-60-9	hexahydro-4-methylphthalic anhydride
85-44-9	Phthalic anhydride
931-36-2	2-ethyl-4-methylimidazole
822-36-6	4-methylimidazole
616-47-7	1-methylimidazole

· **Canadian Ingredient Disclosure list (limit 0.1%)**

85-44-9	Phthalic anhydride

· **Canadian Ingredient Disclosure list (limit 1%)**

7440-22-4	Silver
85-43-8	1,2,3,6-tetrahydrophthalic anhydride

· **Chinese Chemical Inventory of Existing Chemical Substances:**

All ingredients are listed.

· **Japanese Existing and New Chemical Substance List:**

All ingredients are listed.

· **Korean Existing Chemical Inventory:**

7440-22-4	Silver
34090-76-1	4-Methyltetrahydrophthalic anhydride
85-43-8	1,2,3,6-tetrahydrophthalic anhydride
19438-60-9	hexahydro-4-methylphthalic anhydride
85-44-9	Phthalic anhydride
931-36-2	2-ethyl-4-methylimidazole
822-36-6	4-methylimidazole
616-47-7	1-methylimidazole

· **European Pre-registered substances:**

All ingredients are listed.

· **REACh - Substances of Very High Concern (SVHC) List:**

19438-60-9	hexahydro-4-methylphthalic anhydride	2.5-<5%

· **Restriction of Hazardous Substances Directive (RoHS) list:**

None of the ingredients is listed.

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16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department Issuing (M)SDS:** Product Safety Department
· **Contact:** msds@resinlab.com

· **Abbreviations and acronyms:**
ACGIH: American Conference of Governmental Industrial Hygienists
ACToR: US EPA Aggregated Computational Toxicology Resource
ADR: European Agreement Concerning the International Carriage of Dangerous Goods by Road
BCF: Bioconcentration Factor
CAS: Chemical Abstracts Service (division of the American Chemical Society)
CCRIS: US NLM TOXNET Chemical Carcinogenesis Research Information System
CHRIP: Japan NITE Information on Biodegradation and Bioconcentration of the Existing Chemical Substances in the Chemical Risk Information Platform
DOT: US Department of Transportation
DSL: Canada Domestic Substance List
ECHA: European Chemicals Agency's Dissemination portal with information on chemical substances registered under REACH
ESIS: European Chemical Substances Information System
HMIS: US National Paint & Coatings Association (NPCA) Hazardous Materials Identification System
HPVIS: US EPA High Production Volume Information System
HSDB: US NLM TOXNET Hazardous Substances Databank
HSNO CCID: New Zealand Hazardous Substances and New Organisms Chemical Classification Information Database
IARC: International Agency for Research on Cancer developed by United Nations World Health Organisation (WHO)
IATA-DGR: Dangerous Goods Regulations (DGR) by the International Air Transport Association (IATA)
ICAO-TI: Technical Instructions (TI) by the International Civil Aviation Organization (ICAO)
ICSC: International Chemical Safety Cards
IMDG: International Maritime Dangerous Goods; the principal international rules for International Carriage of Dangerous Goods by SEA under the Recommendations on the Transport of Dangerous Goods by United Nations (RTDG)
IUCLID: EU REACh International Uniform Chemical Information Database
Koc: Partition coefficient, soil Organic Carbon to water
LC50/LD50: Lethal Concentration/Dose, 50 percent
N/a: Not available or Not applicable
NFPA: US National Fire Protection Association
NIOSH: US National Institute of Occupational Safety and Health
NITE: National Institute of Technology and Evaluation, Japan
NLM TOXNET: US National Library of Medicine Toxicology Data Network
OECD: Organisation for Economic Co-operation and Development
OSHA: US Occupational Safety and Health Administration
P: Marine Pollutant
RCRA: Resource Conservation and Recovery Act (USA)
REACh: EU Registry, Evaluation and Authorisation of Chemicals
RID: the Regulations Concerning the International Carriage of Dangerous Goods by Rail; published by the Central Office for International Carriage by Rail (OTIF)
RTDG: the Recommendations on the Transport of Dangerous Goods by United Nations (UN)
RTECS: US Registry of Toxic Effects of Chemical Substances
SARA: US Superfund Amendments and Reauthorization Act
SIDS: OECD existing chemicals Screening Information Data Sets
SVHC: EU ECHA Substance of Very High Concern
TEEL: Temporary Emergency Exposure Limit developed by US Subcommittee on Consequence Assessment and Protective Actions (SCAPA) of US Department of Energy (DOE)
TOXLINE: US NLM bibliographic database search system
TSCA: US Toxic Substance Control Act

· **Date of preparation / last revision** 05/20/2015 / 2