

**7-33 Amsterdam Street
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SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier Tetrapropenyl Succinic Anhydride **Synonyms:** Dihydro-3-(tetrapropenyl)-2,5-furandione, DDSA (Dodecanyl Succinic Anhydride)

Chemical Abstracts Registry No: 26544-38-7 **REACH Registration Number:** 01-2119979080-37-0001

1.2. Relevant identified uses of the substance or mixture and uses advised against

Chemical intermediate; formulation of industrial preparations; epoxy curing agents; lubricants

1.3. Details of the supplier of the safety data sheet

Broadview Technologies, Inc.
7-33 Amsterdam Street
Newark, NJ 07105

e-mail Address: prhodes@broadview-tech.com

1.4. Emergency telephone number

Broadview: 973-465-0077

CHEMTREC (USA): 1-800-424-9300 (collect calls accepted) **CHEMTREC (International):** 1-703-527-3887 (collect calls accepted) **NRCC (China):** +86 532 83889090

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture (According to Regulation (EC) No 1272/2008)

Skin Sensitization Category
1A Serious Eye Irritation
Category 2 Environmental
Chronic Category 4

(According to Directive 67/548/EEC)

Symbol: Xi **Risk Phrases:** R36: Irritating to the eyes. R43: May cause sensitisation by skin contact. R53: May cause long term adverse effects in the aquatic environment. **Safety Phrases:** S24/25: Avoid contact with skin and eyes. S27/28: After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of soap and water. S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.

2.2. Label elements

Hazard Symbols (Pictogram):



Signal Word: Warning



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Hazard Precautions: H317 - May cause an allergic skin reaction.
 H319 - Causes serious eye irritation.
 H413 - May cause long lasting harmful effects to aquatic life.

Prevention Precautionary Statements: P280 - Wear protective gloves/protective clothing/eye protection/face protection.
 P273 - Avoid release to the environment.

First Aid Precautionary Statements: P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
 P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
 P363 - Wash contaminated clothing before reuse.
 P337+P313 - If eye irritation persists: Get medical advice/attention.

SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (weight %)	EC Number	CLP Inventory/ Annex VI	EU DSD Classification (67/548/EEC)	EU CLP Classification (1273/2008)
Tetrapropenyl Succinic Anhydride	26544-38-7	~ 100	247-781-6	Not listed.	Xi R36; R43; R53	Eye Irrit. 2; H319 Skin Sens. 1; H317 Aquatic Chronic 4; H413

NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable). See Section 16 for the full text of the R-phrases above.

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact: Immediately flush with water for 15 minutes. Wash the contaminated skin with soap and water. If irritation develops, call a physician.

Eye Contact: Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.

Inhalation: Remove from exposure. If not breathing, give artificial respiration and call a physician.

Ingestion: If swallowed, contact physician or poison control center immediately.

4.2. Most important symptoms and effects, both acute and delayed

Acute: Causes moderate eye irritation. Can cause skin irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Mists, fumes and vapors from this product may cause respiratory irritation. Ingestion may cause irritation of the mouth, throat and digestive tract.

Delayed Effects: None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to Physician: No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.



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SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media: Water spray, alcohol-resistant foam, carbon dioxide, dry chemical.

5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion: As with other organic materials, combustion will produce carbon monoxide and carbon dioxide.
Potential for Dust Explosion: Not applicable.
Special Flammability Hazards: Not applicable.

5.3. Advice for firefighters

Basic Fire Fighting Guidance: Wear self-contained breathing apparatus and full protective clothing (i.e., Bunker gear). Skin and eye contact should be avoided. Normal fire fighting procedures may be used.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Special Instructions: See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

6.3. Methods and material for containment and cleaning up

Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. Contain spilled liquid with sand or vermiculite and place in chemical waste container. Prevent runoff from entering drains, sewers, and streams. After collection of material, flush area with water. Dispose of contents & container in accordance with local, regional, national or international regulations.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for Unique Hazards: Not applicable.

Practices to Minimize Risk: Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds.

Special Handling Equipment: Not applicable.



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7.2. Conditions for safe storage, including any incompatibilities

Storage Precautions & Recommendations: This product should be stored at ambient temperature in a dry, well-ventilated location. Protect containers against physical damage. Keep away from heat, sparks, and flame. Should be periodically inspected.

Dangerous Incompatibility Reactions: Avoid strong acids, strong bases, and oxidizing agents.

Incompatibilities with Materials of Construction: None known

7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limit: Not applicable.

Air Monitoring Method: No data available.

Derived No Effect Levels (DNELs) – Workers:

Route	DNEL
Acute - systemic effects (dermal)	1.0 mg/kg bw/d
Long-term - systemic effects (dermal)	0.33 mg/kg bw/day
Long-term - systemic effects (inhalation)	Not established exposure unlikely
Long term - local effects (dermal)	10 mg/kg bw/day
Long term - systemic (oral) reproductive	0.5 mg/kg bw/day
Long term - systemic (oral) developmental	5 mg/kg bw/day

Derived No Effect Levels (DNELs) – General Population:

Route	DNEL
Acute - systemic effects (oral, dermal, inhalation)	Qualitative assessment - skin/eye/respiratory irritant. No applications involving general population
Long-term - systemic effects (oral)	
Long-term - systemic effects (dermal)	
Long-term - systemic effects (inhalation)	
Acute and long-term - local effects (dermal, inhalation)	

Predicted No Effect Concentrations (PNECs):

Route	PNEC
PNEC aqua (freshwater)	0.02 mg/L
PNEC aqua (marine water)	0.002 mg/L
PNEC aqua (intermittent releases)	0.2 mg/L



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PNEC aqua (DTP)	10 mg/L
PNEC sediment (freshwater)	1.7 mg/kg sediment dw
PNEC sediment (marine water)	0.17 mg/kg sediment dw
PNEC soil	0.2 mg/kg soil dw
PNEC oral (wildlife exposures)	Derivation waived - log Kow > 3

8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

Other Engineering Controls: All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.

Personal Protective Equipment: Wear nitrile or polyvinyl chloride gloves conforming to at least EN374. Use safety glasses with side shields under normal exposure conditions; use chemical goggles where there is potential for splashing, spraying or generation of mists or vapors. Respiratory protection is not normally required, but where overexposure is a concern, use NIOSH-approved chemical cartridge respirator with organic vapor cartridges.

Respirator Caution: Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.

Thermal Hazards: Not applicable.

Environmental Exposure Controls: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	Clear, pale yellow to pink, viscous liquid with a slight odor.		
Molecular Formula:	C ₁₆ H ₂₆ O ₃	Molecular Weight:	266.37
Vapor Pressure:	0.57 mm Hg @ 20°C	Evaporation Rate:	0.02-0.1 (n-Butyl acetate = 1)
Specific Gravity or Density:	1.002 g/cm ³ @ 20°C	Vapor Density (air = 1):	9.2
Boiling Point:	(decomposes) 260°C	Freezing / Melting Point:	< 20°C
Solubility in Water:	Insoluble	Octanol / Water Coefficient:	log Kow > 4.39
pH:	No data available.	Odor Threshold:	No data available.
Viscosity:	430 mPa-s @ 20°C	Autoignition Temperature:	310 - 313°C
Flash Point and Method:	352°F (177°C) Closed Cup	Flammable Limits:	No data available.
Flammability (solid, gas):	Not flammable	Decomposition Temperature:	No data available.
Explosive Properties:	Not explosive	Oxidizing Properties:	No data available.



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SECTION 10: Stability and reactivity

10.1. Reactivity	Not classified as dangerously reactive.
10.2. Chemical stability	Stable under normal expected handling conditions. Hydrolyzes slowly with water.
10.3. Possibility of hazardous reactions	Not expected to occur.
10.4. Conditions to avoid	Avoid heat and contact with incompatible materials
10.5. Incompatible materials	Avoid strong acids, strong bases, and oxidizing agents.
10.6. Hazardous decomposition products	Carbon dioxide, carbon monoxide. Products from combustion may include dense smoke, irritating and toxic fumes and vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD₅₀:	2900 mg/kg (rat)	KEY, Gabriel, KL (1978)
Acute Dermal LD₅₀:	LD ₁₀₀ = 6200 - 7500 mg/kg (rabbit)	KEY Deichman et al (1969)
Acute Inhalation LC₅₀:	> 5.3 mg/L (4 hours, rat)	KEY Welch (1982)
Skin Irritation:	Non-irritating to skin.	
Eye Irritation:	Moderately irritating to eyes.	
Skin Sensitization:	A similar substance causes skin sensitization in animal tests.	
Mutagenicity:	Negative in Ames Assay, both with and without metabolic activation. A similarly structured product has been shown not to be mutagenic based on a battery of assays.	
Reproductive / Developmental Toxicity:	The category of alkenyl succinic anhydrides has been shown to lack reproductive and developmental toxicity in laboratory assays.	
Carcinogenicity:	This material is not listed by IARC, NTP or OSHA as a carcinogen. No test data is available that indicates this material is a carcinogen.	
Target Organs:	None known	
Aspiration Hazard:	None known.	
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.	
Most important symptoms and effects, both acute and delayed	Causes moderate eye irritation. Can cause skin irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Mists, fumes and vapors from this product may cause respiratory irritation. Ingestion may cause irritation of the mouth, throat and digestive tract. Delayed Effects: None known.	
Additive or Synergistic effects:	None known.	



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SECTION 12: Ecological information

<u>12.1. Toxicity</u>	LC ₅₀ <i>Oncorhynchus mykiss</i> > 100 mg/L/96 h EC ₅₀ <i>Daphnia magna</i> > 100 mg/L/96 h EC ₅₀ <i>Selenastrum capricornutum</i> (algae) = 110 mg/L	Dinehart (2014) Noack, Martin (2013) Ward, et al (1997)
<u>12.2. Persistence and degradability</u>	Does not biodegrade readily.	
<u>12.3. Bioaccumulative potential</u>	Bioconcentration is not expected to occur.	
<u>12.4. Mobility in soil</u>	This material is expected to have essentially no mobility in soil. It absorbs strongly to most soil types.	
<u>12.5. Results of PBT and vPvB assessment</u>	This substance is not a PBT or vPvB.	
<u>12.6. Other adverse effects</u>	No data available.	

SECTION 13: Disposal considerations

<u>13.1. Waste treatment methods</u>	
US EPA Waste Number:	Non-Hazardous
Waste Classification: (per US regulations)	The waste may be classified as "special" or hazardous per State regulations.
Waste Disposal:	NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:

14.1. UN number	Not applicable	14.2. UN proper shipping name	Chemicals, n.o.s. (Tetrapropenylsuccinic Anhydride)
14.3. Transport hazard class(es)	Not applicable	14.4. Packing group	Not applicable
14.5. Environmental hazards	Not applicable		
14.6. Special precautions for user	Not applicable.		
NA Emergency Guidebook Numbers:	Not applicable	IMDG EMS:	Not applicable
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code			Not applicable.

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SECTION 15: Regulatory information

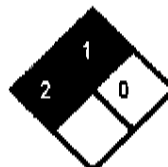
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Inventory Lists:	Status:		
USA TSCA:	Listed	EINECS:	Listed (247-781-6)
Canada(DSL/NDSL):	Listed (DSL)	Japan:	Listed ((2)-852X)
Korea:	Listed (KE-10752)	Australia:	Listed
China:	Listed	Philippines:	Listed
Taiwan:	Listed	New Zealand:	Listed
WHMIS Classification:	Class D, Division 2, Subdivision B: Irritant.		
German Water Hazard Classification:	ID Number 5131, hazard class 1 - low hazard to waters (<i>dihydro-3-(tetrapropenyl)furan-2,5-dion</i>)		
SARA 313:	Not applicable.		
Reportable Quantities:	Not applicable.		
State Regulations:	Not applicable.		

HMIS:

HEALTH	2
FLAMMABILITY	1
REACTIVITY	0

NFPA:



15.2. Chemical safety assessment

A chemical safety assessment has been prepared for this product.

SECTION 16: Other information

Full text of R phrases in Section 3:
 R36: Irritating to the eyes.
 R43: May cause sensitisation by skin contact.
 R53: May cause long term adverse effects in the aquatic environment.

Key Data Sources:
 Literature Reference:

- Deichmann WB and Gerare HW (1969) Tetropenyk succinic anhydride, Toxicology of Drugs and Chemical, DDSA-OSA Consortium
- Dinehart, Simon, (2014) Tetrapropenyl Succinic Anhydride: Acute Toxicity of the Water Soluble Fraction (WSF) to the Rainbow Trout, *Onchorhynchus mykiss*, ABC Study No. 80483.
- Gabriel KL 1978 Acute Oral Toxicity-Rats, Biosearch, Inc. The Lubrizol Company
- Hershman RJ (1983), Summary of Results of Primary Eye Irritation Study, The Lubrizol Company
- Nakamura, Y 1999 A quantitative comparison of induction of challenge concentrations inducing a 50% positive response in three skin sensitization, DDSA-OSA Consortium
- Noack, Martina 2013, Tripropenyl succinic acid immobilization, Clariant Produkte
- Takawale, Pradeep, 2013 Reproductive Development Toxicity Screening Test including Sperm Analysis in Wistar Rats, Clariant Produkte
- Ward, Magazu, Boeri, 1997, Acute Toxicity of the Water Accommodated Fraction, The Lubrizol Company
- Welch J, 1982 Inhalation Toxicity Study in Rats with EPA results, Buffalo Color Corp, Paterson NJ

Classification Method: On basis of test data; Bridging principle - Substantially similar mixtures; Expert judgment



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Legend of Abbreviations:

<i>ACGIH = American Conference on Governmental Industrial Hygienists.</i>	<i>LD = Lethal Dose.</i>
<i>CAS = Chemical Abstracts Service.</i>	<i>NFPA = National Fire Protection Association.</i>
<i>CFR = Code of Federal Regulations.</i>	<i>NIOSH = National Institute of Occupational Safety and Health.</i>
<i>DSL/NDL = Domestic Substances List/Non-Domestic Substances List.</i>	<i>NTP = National Toxicology Program.</i>
<i>EC = European Community.</i>	<i>OSHA = Occupational Safety and Health Administration</i>
<i>EINECS = European Inventory of Existing Commercial Chemical Substances.</i>	<i>PEL = Permissible Exposure Limit.</i>
<i>ELINCS = European List of Notified Chemical Substances.</i>	<i>RQ = Reportable Quantity.</i>
<i>EU = European Union.</i>	<i>SARA = Superfund Amendments and Reauthorization Act of 1986.</i>
<i>GHS = Globally Harmonized System.</i>	<i>TLV = Threshold Limit Value.</i>
<i>LC = Lethal Concentration.</i>	<i>WHMIS = Workplace Hazardous Materials Information System.</i>

Important Note: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. **THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.**

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Issued by:	Regulatory Management Department	Email:	XXXXXXXXXXXX prhodes@broadview-tech.com
Revision Details:	Revised format.		



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Annex Tetrapropenyl Succinic Anhydride - Summary of Uses

ES Number	Name	SU	ERC	PROC
1	Formulation	3/8	2	3,8a,8b,15
2	Use as an intermediate	3/8	6a	3,4,8a,8b,15
3	Use in Lubricants	3/8	4	3,4,8a,8b,15
4	Use as epoxy curing agent	3/8	6d	3,4,8a,8b,15

Tetrapropenyl Succinic Anhydride Exposure Scenario

Note: Guidance below is in addition to that indicated in sections 1-16 of the SDS

ES 1

Title: Formulation

Exposure scenario covering the following

Main Sector of Use Group

- **SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites**
 - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 3: Formulation in closed bath process
- PROC 8a: Transfer of substance- non-dedicated facilities
- PROC 8b: Transfer of substance or preparation (charging/discharging) from / to vessels / large containers at dedicated facilities
- PROC 15: Laboratory use - sampling

Environmental Release Categories

- ERC 2: Formulation

ES 2

Title: Use as an Intermediate

Exposure scenario covering the following

Main Sector of Use Group

- **SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites**
 - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 3: Use in closed batch process (synthesis or formulation)
- PROC 4: Use in batch processes-opportunities for exposure
- PROC 8a: Transfer of substance-Non-Dedicated facilities
- PROC 8b: Transfer of substance or preparation (charging/discharging) from / to vessels / large containers at dedicated facilities
- PROC 15: Laboratory Use -Sampling

Environmental Release Categories

- ERC 6a: Use as an Intermediate



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ES 3

Title: Use in Lubricants

Exposure scenario covering the following

Main Sector of Use Group

- **SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites**
 - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 3: Use in closed batch process (synthesis or formulation)
- PROC 4: Use in batch processes-opportunities for exposure
- PROC 8a: Transfer of substance-Non-Dedicated facilities
- PROC 8b: Transfer of substance or preparation (charging/discharging) from / to vessels / large containers at dedicated facilities
- PROC 15: Laboratory Use -Sampling

Environmental Release Categories

- ERC 4: Industrial use of processing aids in processes and products not becoming part of articles

ES 4

Title: Use as an epoxy curing agent

Exposure scenario covering the following

Main Sector of Use Group

- **SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites**
 - SU8: Manufacture of bulk, large scale chemicals

Process Categories

- PROC 3: Use in closed batch process (synthesis or formulation)
- PROC 4: Use in batch processes-opportunities for exposure
- PROC 8a: Transfer of substance-Non-Dedicated facilities
- PROC 8b: Transfer of substance or preparation (charging/discharging) from / to vessels / large containers at dedicated facilities
- PROC 15: Laboratory Use -Sampling

Environmental Release Categories

- ERC 6d: Industrial use of process regulators for polymerization processes in production of resins, rubbers, polymers

1. Control of Worker Exposure

Product Characteristic

- The material exists only in the liquid form

Amounts used

- Not relevant for human risk assessment

Frequency and duration of use/exposure

Worker exposure per shift

PROC	Hours / shift
3	< 8 hours
4	< 8 hours
8a	< 4 hours
8b	< 4 hours
15	< 1 hour



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Other given operational conditions affecting workers exposure

- The work is performed indoors

Technical conditions and measures at process level (source) to prevent release:

- See Section 7 of SDS

Technical conditions and measures to control dispersion from source towards the worker:

- See Section 7 and 8 of SDS

Ventilation:

PROC	General Ventilation	Local Ventilation
3	General (1-3 air changes per hour)	Yes 90% Efficiency
4	General (1-3 air changes per hour)	Yes 90% Efficiency
8a	General (1-3 air changes per hour)	Yes 90% Efficiency
8b	General (1-3 air changes per hour)	Yes 90% Efficiency
15	General (1-3 air changes per hour)	Yes 90% Efficiency

Organisational measures to prevent /limit releases, dispersion and exposure:

- See SDS

Conditions and measures related to personal protection, hygiene and health evaluation:

- See sections 7, 8 and 10 of SDS
- Respirators: not defined
- Gloves with specific activity training, 95% efficiency assumed for all

2. Control of Environmental Exposure

Product characteristics

- The substance is a liquid.

Frequency and duration of use

- Continuous and Intermittent release possible

Environment factors not influenced by risk management

- Default values of 18,000 m3/d for receiving waters are assumed

Other given operational conditions affecting environmental exposure

- Operations are assumed to be indoors
- Production is in closed systems

Technical conditions and measures at process level (source) to prevent release

- See sections 7 and 8 of the SDS

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Water

- Discharge to STP: Treatment efficiency assumed 90.19%
- STP Discharge rate: 2000 m3 / day
- Compliance with local water discharge regulations

Use	Release Rate %	Basis
1: Formulation	0	FEICA 2.1bv2:Formulation of solvent borne adhesives
2:Use as Intermediate	0.01	Closed system; upper worst case release limit
3: Use in Lubricants	0.01	Worst case assumption
4: Use as Epoxy Curing Agent	0.005	ERC based

Air

Use	Release Rate %	Basis
1: Formulation	0.024	FEICA 2.1bv2:Formulation of solvent borne adhesives
2:Use as intermediate	0	Use in closed systems
3: Use in Lubricants	0	Low vapour pressure; controlled systems
4: Use as Epoxy Curing Agent	0	Low vapour pressure; controlled systems



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Predicted Exposure Concentrations - Worker:

Dermal: Acute Systemic: mg/kg bw/day	Qual	Qual	Qual	Qual	Qual
Dermal: Long Term Local: mg/cm ²	Qual	Qual	Qual	Qual	Qual
Dermal: Long Term Systemic: mg/kg/bw/day	0.034	0.034	0.069	0.034	0.034

Qual: Qualitative assessment completed to demonstrate control considering alternate modes and the use of defined Operational Conditions and Risk Management Measures

Risk Characterization Ratio - Worker:

Route of exposure: ES 1	PROC 3	PROC 4	PROC 8a	PROC 8b	PROC 15
Inhalation: Acute Systemic:	Qual	Qual	Qual	Qual	Qual
Inhalation: Long Term Local:	Qual	Qual	Qual	Qual	Qual
Inhalation: Long Term Systemic:	Qual	Qual	Qual	Qual	Qual
Dermal: Acute Systemic:	Qual	Qual	Qual	Qual	Qual
Dermal: Long Term Local:	Qual	Qual	Qual	Qual	Qual
Dermal: Long Term Systemic:	0.105	0.105	0.208	0.105	0.105
Combined: Long Term Systemic	0.105	0.105	0.208	0.105	0.105
Combined: acute systemic	Qual	Qual	Qual	Qual	Qual

Qual: Qualitative assessment completed to demonstrate control considering alternate modes and the use of defined Operational Conditions and Risk Management Measures

The primary hazard is sensitisation by skin contact. Substance is classified as an eye irritant.

Avoid skin contact. Wear gloves conforming to at least EN374. Wear suitable working clothes, taking all precautions against exposure. Wash contaminated clothing before reuse. Contact with aerosols or vapours will cause severe eye irritation. Use suitable eye protection: goggles during normal operations, with faceshield where there is a risk of splashing. Avoid direct eye contact with product, also via contamination on hands.

The vapour pressure of the substance is relatively low and the substance is not expected to readily volatilize. If used at elevated temperatures, vapours may cause respiratory irritation. Where there is a risk of vapour formation, respiratory protection (APF10 or greater) is required.