

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

1.1 Product identifier

Product name : SERADE SYSTEM CLEANER

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

Identified uses
Formulation & (re)packing of substances and mixtures - Industrial Tank-side service additive

1.3 Details of the supplier of the safety data sheet

TotalEnergies Lubrifiants
562 Avenue du Parc de L'île
92029 Nanterre Cedex FRANCE
Tél: +33 (0)1 41 35 40 00
Fax: +33 (0)1 41 35 84 71
rm.msds-lubs@total.com

TOTAL DEUTSCHLAND GMBH
Jean-Monnet-Straße 2
10557 BERLIN
DEUTSCHLAND
Tel: +49 (0)30 2027 60

msds@total.de

Contact

HSE : + 49 (0) 30/ 2027-9429

1.4 Emergency telephone number

National advisory body/Poison Center

Telephone number : Giftnotruf Berlin, Tel.+49 (0)30 19240 (24 h erreichbar, Beratung in Deutsch und Englisch)

Supplier

Telephone number : TOTAL Emergency number: +49 89 220 61012

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Eye Dam. 1, H318
Skin Sens. 1A, H317
Aquatic Chronic 3, H412

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.



Ingredients of unknown toxicity : 5 percent of the mixture consists of component(s) of unknown acute dermal toxicity
5 percent of the mixture consists of component(s) of unknown acute inhalation toxicity

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H318 - Causes serious eye damage.
H317 - May cause an allergic skin reaction.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Response : P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTER or doctor.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364 - Take off contaminated clothing and wash it before reuse.

Storage : Not applicable.

Disposal : Not applicable.

Hazardous ingredients : Amines, coco alkyl, ethoxylated
3(2H)-Isothiazolone, 2-methyl-
1,2-benzisothiazol-3(2H)-one

Supplemental label elements : Not applicable.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Biocidal products regulation

Active substances

Ingredient name	%
2-methyl-2H-isothiazol-3-one	0.99
1,2-benzisothiazol-3(2H)-one	0.99

2.3 Other hazards

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : None known.

**SECTION 3: Composition/information on ingredients****3.2 Mixtures** : Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
2,2'-(methyylimino)diethanol	REACH #: 01-2119488970-24 EC: 203-312-7 CAS: 105-59-9 Index: 603-079-00-5	≤10	Eye Irrit. 2, H319	[1]
2-(2-butoxyethoxy)ethanol	REACH #: 01-2119475104-44 EC: 203-961-6 CAS: 112-34-5 Index: 603-096-00-8	≤10	Eye Irrit. 2, H319	[1] [2]
Amines, coco alkyl, ethoxylated	EC: 500-152-2 CAS: 61791-14-8	≤5	Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Dam. 1, H318	[1]
3(2H)-Isothiazolone, 2-methyl-	REACH #: 01-2120764690-50 EC: 220-239-6 CAS: 2682-20-4 Index: 613-326-00-9	<1	Acute Tox. 3, H301 Acute Tox. 3, H311 Acute Tox. 2, H330 Skin Corr. 1B, H314 Eye Dam. 1, H318 Skin Sens. 1A, H317 Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1, H410 (M=1)	[1] [2]
1,2-benzisothiazol-3(2H)-one	REACH #: 01-2120761540-60 EC: 220-120-9 CAS: 2634-33-5 Index: 613-088-00-6	<1	EUH071 Acute Tox. 4, H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Acute 1, H400 (M=1) Aquatic Chronic 1, H410 (M=1) See Section 16 for the full text of the H statements declared above.	[1] [2]

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Type

- [1] Substance classified with a health or environmental hazard
 [2] Substance with a workplace exposure limit
 [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
 [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
 [5] Substance of equivalent concern
 [6] Additional disclosure due to company policy

Occupational exposure limits, if available, are listed in Section 8.



SECTION 4: First aid measures

4.1 Description of first aid measures

- Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
- Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
 - pain
 - watering
 - redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
 - pain or irritation
 - redness
 - blistering may occur
- Ingestion** : Adverse symptoms may include the following:
 - stomach pains



4.3 Indication of any immediate medical attention and special treatment needed

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO₂, water spray (fog) or foam. Sand.
- Unsuitable extinguishing media** : Do not use water jet.

5.2 Special hazards arising from the substance or mixture

- Hazards from the substance or mixture** : In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous combustion products** : carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides
Silicon Dioxide

5.3 Advice for firefighters

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions

- : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and materials for containment and cleaning up



- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product.
- 6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

- Recommendations** : Not available.
- Industrial sector specific solutions** : Not available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits



Product/substance	Exposure limit values
2-(2-butoxyethoxy)ethanol	<p>TRGS 900 OEL (Germany, 3/2019). TWA: 67 mg/m³ 8 hours. PEAK: 100.5 mg/m³ 15 minutes. TWA: 10 ppm 8 hours. PEAK: 15 ppm 15 minutes.</p> <p>DFG MAC-values list (Germany, 7/2019). TWA: 67 mg/m³ 8 hours. PEAK: 100.5 mg/m³, 4 times per shift, 15 minutes. TWA: 10 ppm 8 hours. PEAK: 15 ppm, 4 times per shift, 15 minutes.</p>
3(2H)-Isothiazolone, 2-methyl-1,2-benzisothiazol-3(2H)-one	<p>DFG MAC-values list (Germany, 7/2019). Skin sensitizer. DFG MAC-values list (Germany, 7/2019). Skin sensitizer.</p>

Reportable hazardous constituent(s) contained in UVCB and/or multi-constituent substance(s) complying with the classification criteria and/or with an exposure limit (OEL)

No exposure limit value known.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Advisory OEL : No known significant effects or critical hazards.

DNELs/DMELs

Product/substance	Type	Exposure	Value	Population	Effects
2,2'-(methylimino)diethanol	DNEL	Long term Oral	0.13 mg/kg bw/day	General population	Systemic
	DNEL	Long term Inhalation	0.4 mg/m ³	General population	Systemic
	DNEL	Long term Dermal	0.67 mg/kg bw/day	General population	Systemic
	DNEL	Long term Dermal	5.6 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	7.9 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	0.05 mg/cm ²	Workers	Local
	DNEL	Long term Dermal	0.03 mg/cm ²	General population	Local
2-(2-butoxyethoxy)ethanol	DNEL	Long term Oral	5 mg/kg bw/day	General population	Systemic
	DNEL	Long term Inhalation	40.5 mg/m ³	General population	Local
	DNEL	Long term Inhalation	40.5 mg/m ³	General population	Systemic
	DNEL	Long term Dermal	50 mg/kg bw/day	General population	Systemic
	DNEL	Short term	60.7 mg/m ³	General	Local



3(2H)-Isothiazolone, 2-methyl-	DNEL	Inhalation Long term	67.5 mg/m ³	Workers	Local
	DNEL	Inhalation Long term	67.5 mg/m ³	Workers	Systemic
	DNEL	Dermal Long term	83 mg/kg bw/day	Workers	Systemic
	DNEL	Inhalation Short term	101.2 mg/ m ³	Workers	Local
	DNEL	Dermal Long term	20 mg/kg bw/day	Workers	Systemic
	DNEL	Dermal Long term	10 mg/kg bw/day	General population	Systemic
	DNEL	Inhalation Long term	34 mg/m ³	General population	Systemic
	DNEL	Oral Long term	1.25 mg/ kg bw/day	General population	Systemic
	DNEL	Inhalation Short term	50.6 mg/m ³	General population	Local
	DNEL	Inhalation Short term	43 µg/m ³	General population	Local
	DNEL	Oral Short term	53 µg/kg bw/day	General population	Local
	DNEL	Inhalation Long term	21 µg/m ³	General population	Local
	DNEL	Oral Long term	27 µg/kg bw/day	General population	Systemic
	DNEL	Inhalation Short term	43 µg/m ³	Workers	Local
1,2-benzisothiazol-3(2H)-one	DNEL	Inhalation Long term	21 µg/m ³	Workers	Local
	DNEL	Inhalation Long term	6.81 mg/m ³	Workers	Systemic
	DNEL	Dermal Long term	0.966 mg/ kg bw/day	Workers	Local
	DNEL	Inhalation Long term	1.2 mg/m ³	General population	Systemic
	DNEL	Dermal Long term	0.345 mg/ kg bw/day	General population	Systemic
	DNEL	Inhalation Long term	0.345 mg/ kg bw/day	General population	Systemic

PNECs

Product/ingredient name	Compartment Detail	Name	Method Detail
2,2'-(methylimino)diethanol	Fresh water	0.1 mg/l	-
	Marine water	0.0045 mg/l	-
	Fresh water sediment	0.78 mg/kg dwt	-
	Marine water sediment	0.0351 mg/kg dwt	-
	Soil	0.097 mg/kg dwt	-
	Sewage Treatment Plant	10 mg/kg dwt	-
2-(2-butoxyethoxy)ethanol	Fresh water	1 mg/l	-
	Marine water	0.1 mg/l	-
	Fresh water sediment	4 mg/kg dwt	-
	Marine water sediment	0.4 mg/kg dwt	-
	Soil	0.4 mg/kg dwt	-
	Sewage Treatment Plant	200 mg/l	-
3(2H)-Isothiazolone, 2-methyl-	Soil	47.1 µg/kg dwt	-
	Fresh water	3.39 µg/l	-
	Marine water	3.39 µg/l	-
	Sewage Treatment Plant	230 µg/l	-



Plant

8.2 Exposure controls

Appropriate engineering controls : 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.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Hydrocarbon-proof gloves

nitrile rubber

Fluorinated rubber

Neoprene gloves.

PVC

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

In case of prolonged contact with the product, it is recommended to wear gloves complying with EN 420 and EN 374 standards, protecting at least for 480 minutes and having a thickness of 0,38 mm at least. These values are indicative only. The level of protection is provided by the material of the glove, its technical characteristics, its resistance to the chemicals to be handled, the appropriateness of its use and its replacement frequency

Viton®

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator with combination filter for vapor/particulate Type A/P1 Warning ! filters have a limited use duration The use of breathing apparatus must comply strictly with the manufacturer's instructions and the regulations governing their choices and uses None under normal use conditions



Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	: Liquid. [limpid]
Color	: Brown.
Odor	: Characteristic.
Odor threshold	: Not available.
pH	: 10.5
Melting point/freezing point	: Not available.
Initial boiling point and boiling range	: Not available.
Flash point	: Not available.
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Upper/lower flammability or explosive limits	: Not available.
Vapor pressure	: Not available.
Vapor pressure 37.8°C (100°F)	: Not available.
Vapor density	: Not available.
Relative density	: 1.022
Solubility(ies)	: Easily soluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/ water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Kinematic (40°C): 0.0198 cm ² /s
Explosive properties	: Not available.
Oxidizing properties	: Not applicable

9.2 Other information

SECTION 10: Stability and reactivity

10.1 Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	: The product is stable.
10.3 Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	: No specific data.



10.5 Incompatible materials : strong acids
Bases

10.6 Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/substance	Result	Species	Dose	Exposure	Test
2,2'-(methylimino)diethanol	LD50 Dermal	Rabbit - Male, Female	10244 mg/kg	-	OECD 402
2-(2-butoxyethoxy)ethanol	LD50 Oral	Rat	4680 mg/kg	-	OECD 401
	LC50 Inhalation Dusts and mists	Rat	5.1 mg/l	4 hours	-
	LD50 Dermal	Rabbit	2201 mg/kg	-	-
Amines, coco alkyl, ethoxylated	LD50 Oral	Rat	4500 mg/kg	-	-
	LD50 Oral	Rat	5500 mg/kg	-	-
	LD50 Oral	Rat	750 mg/kg	-	-
	LD50 Oral	Rat	750 mg/kg	-	-
3(2H)-Isothiazolone, 2-methyl-	LC50 Inhalation Dusts and mists	Rat	0.11 mg/l	4 hours	OECD 403
	LD50 Dermal	Rat	242 mg/kg	-	OECD 402
1,2-benzisothiazol-3(2H)-one	LD50 Oral	Rat	120 mg/kg	-	-
	LD50 Dermal	Rat	>2000 mg/kg	-	OECD 402
	LD50 Oral	Rat - Female	490 mg/kg	-	OECD 401

Conclusion/Summary : Based on available data, the classification criteria are not met.

Acute toxicity estimates

Product/substance	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
SERADE SYSTEM CLEANER	6709.9	24444.4	N/A	N/A	11.1
2,2'-(methylimino)diethanol	4680	10244	N/A	N/A	N/A
2-(2-butoxyethoxy)ethanol	4500	2201	N/A	N/A	5.1
Amines, coco alkyl, ethoxylated	750	N/A	N/A	N/A	N/A
3(2H)-Isothiazolone, 2-methyl-	120	242	N/A	N/A	0.11
1,2-benzisothiazol-3(2H)-one	490	N/A	N/A	N/A	N/A

Irritation/Corrosion

Product/substance	Result	Species	Score	Exposure	Test
2,2'-(methylimino)diethanol	Eyes - Mild irritant	Rabbit	-	5 UI	-
	Skin - Mild irritant	Rabbit	-	502 mg	-
	Skin - Erythema/Eschar	Rabbit	0	-	OECD 404
2-(2-butoxyethoxy)ethanol	Eyes - Cornea opacity	Rabbit	1	-	OECD 405
	Eyes - Moderate irritant	Rabbit	-	24 hours 20 mg	-
Amines, coco alkyl, ethoxylated	Eyes - Severe irritant	Rabbit	-	20 mg	-
	Eyes - Moderate irritant	Rabbit	-	100 mg	-
1,2-benzisothiazol-3(2H)-one	Skin - Mild irritant	Human	-	48 hours 5 %	-
	Skin - Edema	Rabbit	0.8	4 hours	OPP 81-5 Acute Dermal Irritation
	Eyes - Edema of the	Rabbit	2.4	-	OPP 81-4



	conjunctivae				
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Conclusion/Summary

- Skin** : Based on available data, the classification criteria are not met.
Eyes : Based on available data, the classification criteria are met.
Respiratory : Based on available data, the classification criteria are not met.

Sensitization

Product/substance	Route of exposure	Species	Result
2,2'-(methylimino)diethanol 1,2-benzisothiazol-3(2H)-one	skin	Guinea pig	Not sensitizing
	skin	Guinea pig	Sensitizing

Conclusion/Summary

- Skin** : Based on available data, the classification criteria are met.
Respiratory : Based on available data, the classification criteria are not met.

Mutagenicity

Product/substance	Test	Experiment	Result
2,2'-(methylimino)diethanol	OECD 471	Experiment: In vitro Subject: Bacteria	Negative
	OECD 476	Experiment: In vitro Subject: Mammalian-Animal	Negative
	OECD 473	Experiment: In vitro Subject: Mammalian-Animal	Negative
	OECD 474	Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic	Negative

- Conclusion/Summary** : Based on available data, the classification criteria are not met.

Carcinogenicity

- Conclusion/Summary** : Based on available data, the classification criteria are not met.

Reproductive toxicity

Product/substance	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
2,2'-(methylimino)diethanol	Negative	Negative	Negative	Rat - Male, Female	Oral	-

- Conclusion/Summary** : Based on available data, the classification criteria are not met.

Teratogenicity

Product/substance	Result	Species	Dose	Exposure
2,2'-(methylimino)diethanol	Negative - Dermal	Rat - Male, Female	-	21 days; 6 hours per day

- Conclusion/Summary** : Based on available data, the classification criteria are not met.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.



Information on the likely routes of exposure : Not available.

Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : May cause an allergic skin reaction.
- Ingestion** : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Ingestion** : Adverse symptoms may include the following:
stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Product/substance	Result	Species	Dose	Exposure
2,2'-(methylimino)diethanol	Sub-chronic NOAEL Dermal	Rat - Male, Female	100 mg/kg	13 weeks; 5 days per week

- Conclusion/Summary** : Not available.
- General** : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Other information : Not available.

**SECTION 12: Ecological information****12.1 Toxicity**

Product/substance	Result	Species	Exposure	Test
2,2'-(methylimino)diethanol	Acute EC50 >100 mg/l	Algae - Desmodesmus subspicatus	72 hours	-
	Acute EC50 233 mg/l	Daphnia - Daphnia Magna	48 hours	-
	Acute LC50 762 mg/l	Fish	96 hours	-
	Chronic NOEC 6.25 mg/l	Algae - Desmodesmus subspicatus	72 hours	-
2-(2-butoxyethoxy)ethanol	Acute EC50 100 mg/l	Algae - Desmodesmus subspicatus	72 hours	-
	Acute EC50 100 mg/l	Daphnia - Daphnia magna	48 hours	-
	Acute LC50 1300 mg/l	Fish	96 hours	-
	Acute LC50 1300000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours	-
3(2H)-Isothiazolone, 2-methyl-	Acute EC50 0.157 mg/l	Algae - green algae	72 hours	OECD 201
	Acute EC50 0.934 mg/l	Daphnia - Daphnia Magna	48 hours	202
1,2-benzisothiazol-3(2H)-one	Acute LC50 4.77 mg/l	Fish	96 hours	203
	Chronic NOEC 0.044 mg/l	Daphnia - Daphnia magna	21 days	OECD 211
	Acute EC10 10.3 mg/l	Micro-organism	3 hours	OECD 209
	Acute EC50 0.11 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours	-
	Acute EC50 2.9 mg/l	Daphnia - Daphnia magna	48 hours	OECD 202
	Acute LC50 2.2 mg/l	Fish - Cyprinodon variegatus	96 hours	OECD 203
	Chronic NOEC 0.04 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours	OECD 201

12.2 Persistence and degradability

Product/substance	Test	Result	Dose	Inoculum
1,2-benzisothiazol-3(2H)-one	OECD 301C	0 % - Not readily - 28 days	-	-

Conclusion/Summary : Not available.

Product/substance	Aquatic half-life	Photolysis	Biodegradability
2,2'-(methylimino)diethanol	-	-	Readily
2-(2-butoxyethoxy)ethanol	-	-	Readily
3(2H)-Isothiazolone, 2-methyl-	-	-	Not readily
1,2-benzisothiazol-3(2H)-one	-	-	Not readily

12.3 Bioaccumulative potential

Product/substance	LogK _{ow}	BCF	Potential
2,2'-(methylimino)diethanol	-1.08	-	low
2-(2-butoxyethoxy)ethanol	0.56	-	low
3(2H)-Isothiazolone, 2-methyl-	-0.486	-	low
1,2-benzisothiazol-3(2H)-one	0.7	-	low

12.4 Mobility in soil



- Soil/water partition coefficient (K_{oc})** : Not available.
- Mobility** : Not available.
- Mobility in soil** : Given its physical and chemical characteristics, the product is generally mobile in the ground. It may contaminate ground water. The product may evaporate. Soluble in water.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

12.6 Other adverse effects : No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used. The following Waste Codes are only suggestions: 07 03 99*

Packaging

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	ADN	IMDG	ICAO/IATA
14.1 UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
14.2 UN proper shipping name	-	-	-	-
14.3 Transport hazard class(es)	-	-	-	-
14.4 Packing group	-	-	-	-



14.5 Environmental hazards	No.	No.	No.	No.
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14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorization

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Other EU regulations

Industrial emissions (integrated pollution prevention and control) - Air : Not listed

Industrial emissions (integrated pollution prevention and control) - Water : Not listed

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is not controlled under the Seveso Directive.

National regulations

Biocidal products regulation

Product/ingredient name	List name	Name on list	Classification	Notes
2-(2-butoxyethoxy)ethanol	DFG MAC-values list	Butyldiglycol; Butoxydiglycol	Listed	-

Storage class (TRGS 510) : 12

**Hazardous incident ordinance**

This product is not controlled under the Germany Hazardous Incident Ordinance.

Hazard class for water : 2

Technical instruction on air quality control : TA-Luft Number 5.2.5: 98%
TA-Luft Class I - Number 5.2.5: 1%

Employment law : Law on the protection of young workers
Regulation on the complementary implementation of the EC Directive on Maternity Protection (MuSchRiV - Maternity Protection Directive Regulation)

International regulations**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Ingredient name	List name	Status
Methyldiethanolamine	Schedule III	Listed

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

- Australia** : All components are listed or exempted.
- Canada** : All components are listed or exempted.
- China** : All components are listed or exempted.
- Europe** : All components are listed or exempted.
- Japan** : **Japan inventory (ENCS)**: All components are listed or exempted.
Japan inventory (ISHL): Not determined.
- New Zealand** : All components are listed or exempted.
- Philippines** : All components are listed or exempted.
- Republic of Korea** : All components are listed or exempted.
- Taiwan** : All components are listed or exempted.
- Thailand** : Not determined.
- Turkey** : All components are listed or exempted.
- United States** : All components are listed or exempted.
- Viet Nam** : All components are listed or exempted.

15.2 Chemical Safety Assessment : This product contains substances for which Chemical Safety Assessments are still required.

**SECTION 16: Other information**

✔ Indicates information that has changed from previously issued version.

Value : ATE = Acute Toxicity Estimate
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 DMEL = Derived Minimal Effect Level
 DNEL = Derived No Effect Level
 EUH statement = CLP-specific Hazard statement
 N/A = Not available
 PBT = Persistent, Bioaccumulative and Toxic
 PNEC = Predicted No Effect Concentration
 RRN = REACH Registration Number
 vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Eye Dam. 1, H318 Skin Sens. 1A, H317 Aquatic Chronic 3, H412	Calculation method Calculation method Calculation method

Full text of abbreviated H statements

H301	Toxic if swallowed.
H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS]

Acute Tox. 2, H330	ACUTE TOXICITY (inhalation) - Category 2
Acute Tox. 3, H301	ACUTE TOXICITY (oral) - Category 3
Acute Tox. 3, H311	ACUTE TOXICITY (dermal) - Category 3
Acute Tox. 4, H302	ACUTE TOXICITY (oral) - Category 4
Aquatic Acute 1, H400	AQUATIC HAZARD (ACUTE) - Category 1
Aquatic Chronic 1, H410	AQUATIC HAZARD (LONG-TERM) - Category 1
Aquatic Chronic 3, H412	AQUATIC HAZARD (LONG-TERM) - Category 3
EUH071	Corrosive to the respiratory tract.
Eye Dam. 1, H318	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
Eye Irrit. 2, H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Skin Corr. 1B, H314	SKIN CORROSION/IRRITATION - Category 1B
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION - Category 2
Skin Sens. 1, H317	SKIN SENSITIZATION - Category 1
Skin Sens. 1A, H317	SKIN SENSITIZATION - Category 1A

Date of revision : 7/22/2021

Date of previous revision : No previous validation

Version : 1

Notice to reader



TotalEnergies

SERADE SYSTEM CLEANER

SDS # : 090596

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Mixture
Code : 090596
Product name : SERADE SYSTEM CLEANER

Section 1 - Title

Short title of the exposure scenario : Formulation & (re)packing of substances and mixtures

List of use descriptors : **Identified use name:** Formulation & (re)packing of substances and mixtures - Industrial
Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15
Sector of end use: SU03, SU10
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC02

Environmental contributing scenarios :

Health Contributing scenarios : **General measures applicable to all activities**
General exposures Use in contained systems Elevated temperature - PROC02
Mixing operations Closed systems Batch processes at elevated temperatures - PROC03
Mixing operations Open systems Batch processes at elevated temperatures - PROC04, PROC05
Mixing operations (open systems) - PROC04, PROC05
Process sampling - PROC04, PROC08b
Bulk transfers Dedicated facility - PROC08b
Drum/batch transfers Dedicated facility - PROC08b
Drum/batch transfers Non-dedicated facility - PROC08a
Equipment cleaning and maintenance - PROC08a, PROC08b
Drum and small package filling - PROC09
Laboratory activities - PROC15
Storage - PROC01, PROC02

Processes and activities covered by the exposure scenario	: Industrial formulation of lubricant additives, lubricants and greases. Includes material transfers, mixing, large and small scale packing, sampling, maintenance.
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Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1:

ATIEL-ATC SPERC 2.Ai-a.v1

Amounts used : Volume manufactured/imported (tonnes/year) : 1.00E+04

Fraction of EU tonnage used in region : 1
Fraction of regional tonnage used locally : 1

Frequency and duration of use : Emission days (days per year) : 300

Environment factors not influenced by risk management : Local freshwater dilution factor : 10
Local marine water dilution factor : 100

Other conditions affecting environmental exposure	: Negligible wastewater emissions as process operates without water contact. Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements) : 5.0E-07 Release fraction to wastewater from process (after typical onsite RMMs and before (municipal) sewage treatment plant): 9.90E-12 Release fraction to soil from process (after typical onsite RMMs): 0
Technical conditions and measures at process level (source) to prevent release	: Common practices vary across sites thus conservative process release estimates used.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: Treat air emission to provide a typical removal efficiency of (%) : 70 Prevent discharge of undissolved substance to or recover from onsite wastewater. User sites are assumed to be provided with oil/water separators and for waste water to be discharged via public sewer system.
Organizational measures to prevent/limit release from site	: Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
Conditions and measures related to sewage treatment plant	: Estimated substance removal from wastewater via domestic sewage treatment (%): (%) : 0.09 Assumed domestic sewage treatment plant flow (m³/d) : 2.00E+03 Maximum allowable site tonnage (M _{safe}) based on release following total wastewater treatment removal (kg/day) : 67 459 676
Conditions and measures related to external treatment of waste for disposal	: External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste	: External recovery and recycling of waste should comply with applicable local and/or national regulations.

Contributing scenario controlling worker exposure for 2: General measures applicable to all activities

Concentration of substance in mixture or article	: Covers percentage substance in the product up to 100 %. (unless stated differently)
Physical state	: Liquid, vapor pressure < 0.5 kPa at Standard Temperature and Pressure
Amounts used	: Not applicable.
Frequency and duration of use/exposure	: Covers daily exposures up to 8 hours (unless stated differently)
Human factors not influenced by risk management	: Not applicable.
Other conditions affecting workers exposure	: Covers percentage substance in the product up to 100% (unless stated differently)
Conditions and measures related to personal protection, hygiene and health evaluation	
Advice on general occupational hygiene	: Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop. Avoid direct eye contact with product, also via contamination on hands.
Personal protection	: Use suitable eye protection.

Contributing scenario controlling worker exposure for 3: General exposures Use in contained systems Elevated temperature

No other specific measures identified.

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

Contributing scenario controlling worker exposure for 4: Mixing operations Closed systems Batch processes at elevated temperatures

Ventilation control measures : Provide extract ventilation to points where emissions occur.

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

Contributing scenario controlling worker exposure for 5: Mixing operations Open systems Batch processes at elevated temperatures

Frequency and duration of use/exposure : Avoid carrying out activities involving exposure for more than 4 hours per day.

Ventilation control measures : Provide extract ventilation to points where emissions occur.

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

Contributing scenario controlling worker exposure for 6: Mixing operations (open systems)

Ventilation control measures : Provide extract ventilation to points where emissions occur.

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

Contributing scenario controlling worker exposure for 7: Process sampling

Frequency and duration of use/exposure : Avoid carrying out activities involving exposure for more than 1 hour per day.

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

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training.

Contributing scenario controlling worker exposure for 8: Bulk transfers Dedicated facility

Frequency and duration of use/exposure : Avoid carrying out activities involving exposure for more than 4 hours per day.

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

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Contributing scenario controlling worker exposure for 9: Drum/batch transfers Dedicated facility

Ventilation control measures : Provide extract ventilation to points where emissions occur.

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

Contributing scenario controlling worker exposure for 10: Drum/batch transfers Non-dedicated facility

Frequency and duration of use/exposure : Avoid carrying out activities involving exposure for more than 1 hour per day.

Ventilation control measures : Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).

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

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Contributing scenario controlling worker exposure for 11: Equipment cleaning and maintenance

Technical conditions and measures to control dispersion from source towards the worker : Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

Engineering controls : Drain down and flush system prior to equipment break-in or maintenance.

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

Advice on general occupational hygiene : Clear spills immediately.

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Contributing scenario controlling worker exposure for 12: Drum and small package filling

Ventilation control measures : Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).

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

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training.

Contributing scenario controlling worker exposure for 13: Laboratory activities

Frequency and duration of use/exposure : Avoid carrying out activities involving exposure for more than 4 hours per day.

Conditions and measures related to personal protection, hygiene and health evaluation**Contributing scenario controlling worker exposure for 14: Storage**

Engineering controls : Store substance within a closed system.

Conditions and measures related to personal protection, hygiene and health evaluation**Section 3 - Exposure estimation and reference to its source**

Website: : Not applicable.

Exposure estimation and reference to its source - Environment: 1:

Exposure assessment (environment): : Used ECETOC TRA model.

Exposure estimation and reference to its source : Not available.

Exposure estimation and reference to its source - Workers: 2:

Exposure assessment (human): : The risk Management Measures/Operational Conditions that are identified in the Exposure Scenario are the outcome of a quantitative and qualitative assessment that covers this product.

Exposure estimation and reference to its source : Not available.

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment : Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SPERC factsheet. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. For further information see www.atiel.org/reach/introduction.

Health : Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. For further information see www.atiel.org/reach/introduction.

Additional good practice advice beyond the REACH CSA

Environment : Not available.

Health : Not available.