SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Identification of the product

Identification of the mixture

Trade name: **PROMOX P250TX**

Synonym most widely used: Mixture

Reach Substance IUPAC: Reaction Mass mixture in Solvents

1.2 Intended use
Relevant identified uses of the substance or mixture and uses advised against
Description / Use

For Industrial/Professional Use – Curing of Unsaturated Polyester Resins – Reaction Initiator - Chemical hardener, polymerization initiator. Use as a synthetic intermediate (SCC). Formulation of preparations based on MEK peroxide. Industrial use for polymerization. Professional use for polymerization. For this product, uses have been identified under REACH.

Formulation of organic peroxides **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites	**PC32:** Polymer preparations and compounds
Formulation of organic peroxides **SU3:** Industrial uses: Uses of substances as such or in preparations at industrial sites	**PC32:** Polymer preparations and compounds
Use of organic peroxide as polymerisation initiator, cross-linking agent **SU3:** Industrial uses: Uses of substances as such or in preparations at industrial sites	**PC32:** Polymer preparations and compounds
Formulation of the substance **SU 10:** Formulation	Polymers processing (industrial)

Industrial use in chemical synthesis or processes and formulation **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites**, SU4:** Manufacture of food products**, SU 8,9:** Manufacture of bulk, large scale substances (including petroleum products); manufacture of fine chemicals**, SU 10:** Formulation**, SU11:** Manufacture of rubber products**, SU12:** Manufacture of plastics products, including compounding and conversion**, SU14:** Manufacture of basic metals, including alloys**, SU15:** Manufacture of fabricated metal products, except machinery and equipment**, SU16:** Manufacture of computer, electronic and optical products, electrical equipment**, SU17:** General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Loading and unloading oprerations, distribution covering all identified uses SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites, SU4: Manufacture of food products, SU6a: Manufacture of wood and wood products, SU 8,9: Manufacture of bulk, large scale substances (including petroleum products); manufacture of fine chemicals, SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys), SU11: Manufacture of rubber products, SU12: Manufacture of plastics products, including compounding and conversion, SU14: Manufacture of basic metals, including alloys, SU15: Manufacture of fabricated metal products, except machinery and equipment, SU16: Manufacture of computer, electronic and optical products, electrical equipment, SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment, SU 21: Consumer uses: Private households (= general public = consumers), SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

1.3 Details of the Supplier of the Safety Data Sheet

PROMOX S.p.A. Via A. Diaz, 22/a 21038 Leggiuno (VA)

Tel. +39/0332/648380 Fax +39/0332/648105 e-mail: info@promox.eu - http://promox.eu

Mail Contact MSDS: Gabriele.Minotti@promox.eu Object: MSDS Date of last issue: Rev. 05 - 01.10.2018

1.4 Emergency telephone number

In the case of any accidental contact, call:

EMERGENCY CALL NUMBER EU	TEL. 112
ANTIPOISONS CENTER - MILAN - ITALY	TEL. +39/02/66101029
PROMOX S.p.A. - 24 hours emergency response number:	TEL. +39/0332/649267

SECTION 2: PRODUCT HAZARD IDENTIFICATION

Classification of the substance or mixture

2.1

Organic peroxides, Type D: H242: Heating may cause a fire. Based on experimental data.
Based on experimental data. Based on product data or assessment.
Acute toxicity, Category 4: H302: Harmful if swallowed. Based on experimental data.
Skin corrosion, Category 1B: H314: Causes severe skin burns and eye damage. Based on experimental data.
Serious eye damage, Category 1: H318: Causes serious eye damage. Based on experimental data.
Acute toxicity, Category 4: H332: Harmful if inhaled. Based on experimental data.
Reproductive toxicity, Category 2. H361d: Suspected of damaging the unborn child. Calculation method.
Chronic aquatic toxicity, 3, H412: Harmful to aquatic life with long lasting effects. Calculation method.

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to Regulation (EC) No. 1272/2008

Organic peroxides Type	D	H242
Acute Toxicity, Oral	4	H302
Skin Irritation/Corrosion	1B	H314
Eye Damage/Irritation	1	H318
Acute Toxicity, Inhalation	4	H332
Reproductive toxicity[2]	2	H361d
Aquatic Chronic Toxicity	3	H412[1]

[1] The hazard statement H412 is applied to the product due to a content > 25% of 1-isopropyl-2,2-dimethyltrimethylene diisobutyrate (EC 229-934-9 - CAS 6846-50-0), used as stabilizing/Diuent additive (EC 700-954-4 - CAS 1338-23-4).

[2] The hazard statement **H361d** is applied to the product due to a content > 3% of 1-isopropyl-2,2-dimethyltrimethylene diisobutyrate (EC 229-934-9 - CAS 6846-50-0), used as stabilizing/Diuent additive (EC 700-954-4 - CAS 1338-23-4).

Information concerning particular hazards for human and environment:
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version. **Classification system:** The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

Hazard pictograms: **Signal word: Danger**

2.2 Label Elements

Labelling according to Regulation (EC) No 1272/2008

Hazard pictograms: **Signal word: Danger**

Signal word/Hazard statement(s) GHS

H- Code
Hazard statements

H242: Heating may cause a fire. **H302:** Harmful if swallowed. **H314:** Causes severe skin burns and eye damage. **H332:** Harmful if inhaled. **H361d:** Suspected of damaging the unborn child. **H412:** Harmful to aquatic life with long lasting effects.

P- Code
Precautionary statements

P201: Obtain special instructions before use. **P202:** Do not handle until all safety precautions have been read and understood. **P210**: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. **P220**: Keep away from dirt, rust, chemicals in particular concentrated acids, alkalis and Accelerators (e.g. heavy metal compounds and amines). **P234:** Keep only in original container. **P264**: Wash ... thoroughly after handling. **P280:** Wear protective gloves/protective clothing/eye protection/face protection. **P303+P361+P353**: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. **P305+P351+P338:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. **P308+P313:** IF exposed or concerned: Get medical advice/attention. **P310** Immediately call a POISON CENTER or doctor/physician. **P405** Store locked up. **P410** Protect from sunlight. **P411+P235:** Store at temperatures not exceeding 30°C / 86 F. Keep cool. **P420:** Store away from other materials. Do not mix with peroxide-accelerators or reducing agents. **P501:** Dispose of contents - container in accordance with local / regional / national / international regulations. Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Information (EUH-Stat.). None.

Special provisions according to ANNEX XVII of Reach regulation abd subsequent amendments:
ANNEX XVII - Conditions of restriction: 3.

Product Content: Reaction mass of butane-2,2-diyl dihydroperoxide and di-sec-butylhexaoxidane - Methyl Ethyl ketone peroxide CAS 1338-23-4, Diacetone alcohol CAS 123-42-2, Methyl ethyl ketone CAS 78-93-3, Hydrogen peroxide solution CAS 7722-84-1, 1-Isopropyl-2,2-dimethyltrimethylene diisobutyrate (CAS 6846-50-0)

Hazardous components which must be listed on the label: Reaction mass of butane-2,2-diyl dihydroperoxide and dioxydibutane-2,2-diyl dihydroperoxide (CAS 1338-23-4), 4-hydroxy-4-methyl-2-pentanone – diacetonalcohol (CAS 123-42-2), Hydrogen peroxide solution (CAS 7722-84-1), Methyl ethyl ketone (CAS 78-93-3), 1-Isopropyl-2,2-dimethyltrimethylene diisobutyrate (CAS 6846-50-0).

Chemical Identity: Reaction mass of butane-2,2-diyl dihydroperoxide and dioxydibutane-2,2-diyl dihydroperoxide in 1-Isopropyl-2,2-dimethyltrimethylene diisobutyrate (CAS 6846-50-0) and 4-hydroxy-4-methyl-2-pentanone.

2.3 Other hazards

Potential health effects: Suspected of damaging the unborn child. Inhalation: Harmful by inhalation. Inhalation of vapours due to thermal decomposition: Risk of irritation of respiratory system. Skin contact: May be harmful in contact with skin. Ingestion: Harmful if swallowed.

Inhalation: Harmful if inhaled. May cause respiratory irritation. High concentrations of fog / vapors can cause headaches, difficulty breathing. Inhalation: Inhalation of vapors by thermal decomposition of the

	product: Risk of irritation of the respiratory tract. At high concentrations of vapors / mists: Possible irritation of the respiratory tract.
Skin Contact	Causes severe skin burns. It can be harmful in contact with the skin.
Eyes Contact	Causes serious eye damage. It can cause delayed inflammation of the cornea.
Ingestion	Harmful if swallowed. May cause liver injury, difficulty breathing, abdominal pain and severe burns of the digestive tract (mouth, throat and stomach). Inhalation during induced vomiting may cause pulmonary edema.
Environmental Effects:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. The product must be used according to good working practices, avoiding its dispersion into the environment (see also sections 6, 7, 13, 14 and 15). All data available on this product and/or on components listed in section 3 and / or on similar substances have been taken into consideration for the hazard assessment. Harmful to aquatic life with long lasting effects. Toxic to aquatic organisms. Harmful to fish. Harmful to daphnia. Toxic to algae. Biodegradability: Result: Not immediately biodegradable. Method: Closed bottle essay. Practically not bioaccumulative. Bioaccumulation: Bioconcentration factor (BCF): 10.3. Not expected considering the low value of the log Pow. Bioaccumulation is unlikely. The substances making up the product do not meet the PBT or vPvB classification criteria set out in Annex XIII of the EC Regulation No. 1907/2006 (REACH). This substance / mixture contains no components considered to be either persistent, bioaccumulative or toxic (PBT), or very persistent and very bioaccumulative (vPvB) at concentrations of 0.1% or higher.
Physical and chemical hazards:	Heating may cause a fire. Flammable liquid (when hot). Thermal decomposition giving flammable and toxic products. Heating may cause a fire. Thermal decomposition giving flammable and toxic products. Decomposition products: See chapter 10. Combustion can develop carbon oxides. It can react quickly and violently if heated or if mixed with incompatible materials (refer to SECTION 10.5). Thermal decomposition can develop oxygen and flammable compounds (eg, Ethane, methane, ethane, ethylene) and other irritating / toxic gases / vapors. Risk of fire due to heating. Thermal decomposition in flammable and toxic products. Decomposition products: see chapter 10. The product can decompose rapidly if mixed with incompatible or heated chemicals. Do not mix directly with amines, oxidizers, acids and alkalis, especially in concentrated form, liquid oxygen, nitric acid, ozone, mineral acids. Store in a cool place away from heat sources or direct sunlight. May ignite combustible materials. See chapter 10. Major adverse effects: see sections 9 to 12.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Preparation in compliance with EU Directives. Information on ingredients:

3.1	**Substance**	Not Applicable
3.2	**Mixture**	Organic Peroxide. Liquid mixture. Preparation based on: Reaction Mass mixture in Solvents. Reaction Mass of butane-2,2-diyl dihydroperoxide and di-sec-butylhexaoxidane. MEKP is a multi-constituent substance consisting of the two main components sec-butylidene hydroperoxide (CAS 2625-67-4, CE 220-091-2, "monomer") and dioxybis (1-methylpropylidene) hydroperoxide (CAS 126-76-1, EC 204-802-3, "Dimer"). Degree of Purity: > = 20.0 - <= 40.0% (w/w).

HAZARDOUS COMPONENTS *ACCORDING TO REGULATION (EC) NO. 1907/2006)*	**N° CAS**	**N° EC**	**N° INDEX**	**N° REACH**	**Classification** *REGULATION (EC) NO 1272/2008*			**% w/w**
REACTION MASS OF BUTANE-2,2-DIYL DIHYDROPEROXIDE AND DIOXYDIBUTANE-2,2-DIYL DIHYDROPEROXIDE [6] ***(METHYL ETHYL KETONE PEROXIDE).***	1338-23-4	700-954-4	----	01-2119514691-43-0005	Organic Peroxide	D	H242	30% - 35% w/w
					Acute Toxicity Oral	4	H302	
					Skin Corrosion	1B	H314	
					Serious Eye damage/Irritat.	1	H318	
					Acute Toxicity Inhalation	4	H332	
2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE	6846-50-0	229-934-9	**----**	01-2119451093-47	Reproductive toxicity.	2	H361d	40% - 50% w/w
					Aquatic Chronic Toxicity	3	H412	
DIACETON ALCOHOL 4-HYDROXY-4-METHYLPENTAN-2-ONE	123-42-2	204-626-7	603-016-00-1	01-2119473975-21	Flammable Liquid	3	H226	≥ 5 - < 10% w/w
					Serious Eye damage/Irritat [1]	2	H319	
					STOT SE Inhalation	3	H335	
2-BUTANONE		201-159-0	606-002-00-3	01-2119457290-43	Flammable Liquid	2	H225	1% - 3% w/w

METHYL ETHYL KETONE					Eye Irritation	2	H319	
					STOT SE	3	H336	
					EUH066			
HYDROGEN PEROXIDE	7722-84-1	231-765-0	008-003-00-9	01-2119485845-22	Oxidizing Liquid[3]	2	H271	1% - 3% w/w
					Acute Tox. Oral	4	H302	
					Skin Corrosion[4]	1A	H314	
					Serious Eye damage/Irritat.	1	H318	
					Acute Toxicity Inhalation	4	H332	
					Aquatic Chronic Toxicity[5]	3	H412	
					STOTSE C≥35%	3A	H335	

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). Status : Not applicable

[6] REACTION MASS OF BUTANE-2,2-DIYL DIHYDROPEROXIDE AND DIOXYDIBUTANE-2,2-DIYL DIHYDROPEROXIDE
MEKP is a multi-constituent substance consisting of the two main components sec-butylidene hydroperoxide (CAS 2625-67-4, CE 220-091-2, "monomer") and dioxybis (1-methylpropylidene) hydroperoxide (CAS 126-76-1, EC 204-802-3, "Dimer"). Degree of Purity: > = 20.0 - <= 40.0% (w/w).

[1] Eye Irrit. 2; H319: C ≥ 10 %
[3] Ox. Liq. 1; H271: C ≥ 70 % ----- Ox. Liq. 2; H272: 50 % ≤ C < 70 %
[4] Skin Corr. 1A; H314: C ≥ 70 % ----- Skin Corr. 1B; H314: 50 % ≤ C < 70 % ----- Skin Irrit. 2; H315: 35 % ≤ C < 50 % ----- Eye Dam. 1; H318: 8 % ≤ C < 50 % ----- Eye Irrit. 2; H319: 5 % ≤ C < 8 % ----- STOT SE 3; H335; C ≥ 35 %.
[5] Aquatic Chronic Toxicity cat. 3 C > 63% w/w

The product may contain as impurities of constituents:
✓ Hydrogen peroxide (EC 231-765-0 - CAS 7722-84-1);
✓ butanone (EC 201-159-0 – CAS 78-93-3)

The product may contain as stabilizing additives of constituents:
✓ 4-hydroxy-4-methylpentan-2-one (EC 204-626-7 - CAS 123-42-2)
✓ 1-isopropyl-2,2-dimethyltrimethylene diisobutyrate (EC 229-934-9 - CAS 6846-50-0), used as stabilizing/Diluent additive

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 and hence require reporting in this section. For the full text of the R phrases mentioned in this Section, see Section 16. For the full text of hazard (H) phrases mentioned in this Section, see Section 16. For more detailed information on health effects and symptoms refer to section 11.

SECTION 4: FIRST AID MEASURES

In case of incident or if you feel unwell, seek medical advice (Show the label where possible).

4.1 Description of first aid measures

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Immediate medical attention is required. Under the shower: Take off immediately all contaminated clothing Including shoes. Risk of ignition. In case of splashes, remove contaminated clothing and plunge it into water immediately. Move out of dangerous area. Show this safety data sheet to the doctor in attendance.

Exposure routes:

General advice:	Move away from the danger area. Call a doctor immediately. Show this safety data sheet to the doctor. Symptoms from poisoning can appear after several hours. First-aiders should pay attention to self-protection and wear the recommended protective clothing. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move out of dangerous area. Call a physician immediately. Show this safety data sheet to the doctor in attendance. Poisoning symptoms may appear after several hours. Emergency personnel should pay attention to safety and wear the recommended protective clothings. Under the shower: Take off immediately all contaminated clothing. Including shoes. Risk of ignition. In case of splashes, remove contaminated clothing and plunge it into water immediately. First Aid responders should pay attention to self-protection and use the recommended protective clothing
Inhalation:	Take the injured person away from the contaminated area. If the injured person shows any signs of breathing-insufficiency, give artificial respiration by means of a self-expanding balloon mask (AMBU). In case of problems: Hospitalise. Keep under medical surveillance. In case of problems: Hospitalise. Immediately take the injured person to the nearest first-aid post. Contact a doctor or a poison control center immediately. Keep under medical surveillance.
In case of eye contact	Act immediately. Wash immediately with plenty of running keeping the eyelid always far from the eye. Immediately take the injured person to an oculist. Continue rinsing your eyes during transport to the hospital. Do not treat injured eyes with any ointments or oils. Do not use eye drops or ointments of any kind before the consultation or advice of the eye doctor. If eye irritation persists, consult a doctor.
In case of skin contact	Remove the accidentally contaminated clothes immediately; wash any affected skin area with plenty of lukewarm water and soap. Wash immediately, abundantly and thoroughly with water. Should there be persistent skin reddening or irritation; take the injured person to the nearest first-aid post for burns treatment. If skin irritation persists, call a physician. If symptoms persist, consult a doctor. In case of extensive burns, admit to the hospital Consult a doctor immediately. In case of extensive burns, hospitalize.
If swallowed	Do not induce vomiting. Clean mouth with water and drink afterwards plenty of water. Take the injured person to the nearest first-aid post. Do not perform gastric lavage, danger foam reflux. Ingestion of this corrosive material can cause serious ulceration, inflammation and possible

	First Aid - Tips	perforation of the digestive canal, with haemorrhage and loss of fluids. Its inhalation during induced vomiting can cause severe damage to the lungs. Do not induce vomiting! May cause chemical burns in mouth and throat. If swallowed, do not induce vomiting. Clean mouth with water and drink afterwards plenty of water and Call a doctor immediately. Its inhalation during induced vomiting can result in severe damage to the lungs. If swallowed, do not induce vomiting. Do not attempt to induce vomiting, rinse the mouth and lips thoroughly with water if the person is conscious, then hospitalize. Do not attempt to induce vomiting, rinse the mouth and lips thoroughly with water if the person is conscious, then go to the hospital.
4.2	Principal symptoms and effects, both acute and delayed.	The symptoms and effects are as expected from the hazards as shown in section 2. Symptoms and effects: Irritation: Irritating to eyes. Harmful if swallowed or if inhaled. Causes serious eye damage. Causes severe burns. Skin contact: Causes serious skin burns and serious eye damage. Inhalation: Strong concentrations of vapors / mists: Possible irritation of the respiratory tract. Immediate medical attention is required. No specific product related symptoms are known.
	Inhalation	Harmful if inhaled. May cause respiratory irritation. High concentrations of fog / vapors can cause headaches, difficulty breathing. Inhalation: Inhalation of vapors by thermal decomposition of the product: Risk of irritation of the respiratory tract. At high concentrations of vapors / mists: Possible irritation of the respiratory tract.
	Skin Contact	Causes severe skin burns. It can be harmful in contact with the skin.
	Eyes Contact	Causes serious eye damage. It can cause delayed inflammation of the cornea.
	Ingestion	Harmful if swallowed. May cause liver injury, difficulty breathing, abdominal pain and severe burns of the digestive tract (mouth, throat and stomach). Inhalation during induced vomiting may cause pulmonary edema.
	Principal symptoms and effects of Overexposure	The symptoms and effects are as expected from the hazards as shown in section 2. No specific product related symptoms are known. If you feel unwell, seek immediate medical attention. If possible, show the safety data sheet or product label. Basic first aid (refer to Section 4.1) and symptomatic treatment. Inhalation: Adverse symptoms may include the following: respiratory tract irritation, cough. Ingestion: stomach pains. Skin contact: Severely corrosive to the skin. Causes severe burns. Eye contact: Severely corrosive to the eyes. Causes severe burns.
	Risks	Harmful if swallowed or if inhaled. Causes serious eye damage. Causes severe burns.
4.3	Indication of any immediate medical attention and special treatment needed	If you feel unwell, seek immediate medical attention. If possible, show the safety data sheet or product label. Basic first aid (refer to Section 4.1) and symptomatic treatment. Notes to physician: Treat symptomatically. Treat the symptoms and offer support to the person. Notes to the doctor: Treat symptomatically. Treat the symptoms and offer support to the person. In the event that large quantities are ingested or inhaled, contact a poison control center immediately. If swallowed, do not induce vomiting. Rinse the mouth with water and immediately send hospitalise the injured person. The ingestion of this corrosive material can cause serious ulceration, inflammation and possible perforation of the digestive tract, with haemorrhage and loss of fluids. Inspiration during induced vomiting can cause severe lung damage. Persons with pre-existing skin, eye, or respiratory disease may be at increased risk from the irritant or corrosive properties of this material. Attending physician should treat exposed patients symptomatically. Contact a poison center for more information on treatment. Poisoning symptoms may appear after several hours.

For more detailed information on health effects and symptoms, see Section 11.

SECTION 5: FIRE-FIGHTING MEASURES

5.1	Extinguishing media	
	Suitable Extinguishing Media:	**Suitable Extinguishing Media: Water Spray, alcohol resistant foam, powder, CO_2. Fight larger fires with Water Spray or alcohol resistant foam.** Always use water as an extinguisher, preferably broken up, keeping windward and at a safe distance. Cool down both the containers which have been involved in the fire and the surrounding area. Do not start cleaning the area or salvaging the goods before the whole area has completely cooled down. In case of product decomposition, this is detectable by the formation of fumes and by containers overheating, cools down with water. After cooling: Carbon dioxide (CO_2), Dry powder
	Unsuitable Extinguishing Media:	**Unsuitable Extinguishing Media: Halones, Water with full jet.**
5.2	Specific hazards during firefighting / Specific hazards arising from the chemical Special hazards arising from the substance or mixture	CAUTION: reignition may occur. Supports combustion. Water spray may be ineffective unless used by experienced firefighters. Do not allow run-off from fire fighting to enter drains or water courses. Hazardous decomposition products formed under fire conditions. Contact with incompatible materials or exposure to temperatures above the self-accelerating decomposition temperature (SADT), could result in a self-accelerating decomposition reaction with the release of flammable vapors that can trigger autonomously. Risk of fire due to heating. The product burns violently (protect yourself from possible splashes). Flash back possible over considerable distance. Vapours may form explosive mixtures with air. The product will float on water and can be reignited on surface water. Cool closed containers exposed to fire with water spray. Risk of fire due to heating. The product burns violently (protect people from possible projections).hrough thermal decomposition, formation of very reactive free radicals. Thermal decomposition giving flammable and toxic products: Ethane, Methane, Ethylene, Carbon oxides. Avoid breathing Fumes/Vapors. Vapors can form explosive mixtures with air. Cool closed containers near the flames with water spray. The heat of the fire can decompose the peroxides present in the area. If not properly cooled the fire can easily resume. The oxygen that develops during decomposition can promote combustion in the event of a fire. In the event of fire or overheating, an increase in

the pressure of the container will occur, which may cause it to burst. The main decomposition products: see also Point n. 10 - Stability and Reactivity. Exposure to combustion or decomposition may result in damage to health. Through Combustion: Toxic products, Carbon oxides. Fire will produce smoke containing hazardous combustion products. The main decomposition products: see also Point n. 10 - Stability and Reactivity. Exposure to combustion or decomposition. Do not use a solid water stream as it may scatter and spread fire. Remove undamaged containers from fire area if it is safe to do so. Use water spray to cool unopened containers.

5.3 Advice for firefighters

Operate in accordance with the provisions reported into the Emergency plan site. Do not use water jet as it may disperse or spread the fire. Fight the fire at a distance. Cool containers / tanks with water spray In the event of a fire in the area, remove containers exposed to fire. Prohibit all sources of sparks and ignition - Do not smoke. Evacuate and isolate the area until the fire is completely extinguished, limiting access only to trained personnel or firefighters. If necessary, wear a self-contained breathing apparatus to extinguish the fire. Evacuate and isolate the area until complete extinction of the fire, restricting access only to trained personnel or the firefighters department. Use personal protective equipment. Firefighters must always wear the complete fire protection equipment: full mask with filter type A for gases / vapors [Ref. EN 143] or breathing apparatus with air supply [Ref. EN 317]; fireproof clothing [Ref. EN 469); fireproof gloves [Ref. EN 659]; boots firefighters [Ref. HO A29-A30]. If possible, operate windward and safety distance, using hoses, or automatic fire extinguishing systems with nozzles positioned above the containers. Remove containers from fire area, if this can be done without risk. Alternatively, cool the containers in order to avoid overheating (excessive increase in pressure can cause the outbreak) and the development of irritating / toxic fumes / gases / vapors. Water sprays can be used to cool closed containers. Ensure adequate ventilation. Avoid breathing gases / vapors and contact with eyes and skin. Prevent contaminated extinguishing water from flowing into drains or watercourses. Do not use a jet of water as it may disperse or spread fire. Remove the intact containers from the fire area if this can be done safely. Water sprays can be used to cool closed containers. Prevent the contaminated extinguishing water from flowing into drains or waterways.

Special protective equipment for firefighters
Specific extinguishing methods

Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment. Do not use a solid water stream as it may scatter and spread fire. Remove undamaged containers from fire area if it is safe to do so. Use water spray to cool unopened containers.

5.4 Additional information

Wear a self-contained respirator and protective clothing. In case of a small fire, extinguish with dust or carbon dioxide and then wet with water to avoid re-ignition. Cool closed containers with water. Cool the peroxide containers exposed to the fire with water and wipe. In case of a small fire, extinguish with dust or carbon dioxide and then wet with water to avoid re-ignition. Do not allow the water used to extinguish a fire to end up in drains or watercourses. Collect the contaminated water used to extinguish the fire separately. Do not discharge it into the sewage system. Dispose of contaminated water used for extinction and fire residue according to current regulations. Use extinguishing systems compatible with the local situation and the surrounding environment. Wear a self-contained respirator and protective clothing. Dispose of contaminated water used for extinction and fire residue according to current regulations. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Fire will produce smoke containing hazardous combustion products (see section 10).

Fire and explosion hazard

CAUTION: reignition may occur. Decomposition under effect of heating (See also Section Hazardous decomposition products). If involved in a fire, it will support combustion. Vapours may form explosive mixtures with air. In case of fire and/or explosion do not breathe fumes. Wear a self-contained respirator and protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and procedures during an emergency.

Evacuate non-essential staff and those not equipped with individual protection apparatus. Prohibit all sources of sparks and ignition - Do not smoke. Prohibit contact with skin and eyes and inhalation of vapours. Use personal protective equipment. In case of insufficient ventilation, wear suitable respiratory equipment. Eliminate all sources of combustion. Observe the recommendations for safe handling and use of personal protective equipment. The vapors can thicken in slightly elevated areas. Vapours can accumulate in low areas. Never return spills in original containers for re-use. In case of insufficient ventilation, wear suitable respiratory equipment. Treat recovered material as described in the section "Disposal considerations". Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations. Beware of vapours accumulating to form explosive concentrations.

For non-emergency workers

For non-emergency workers: Remove from the affected area people not involved in the emergency. Alerting inside emergency workers or firefighters. In case of an immediate action is needed to refer to the guidelines/instructions for emergency workers.

For emergency workers

For emergency workers: Wear an appropriate Personal Protective Equipment: Breathing apparatus with air reserve or full-face gas mask with filter. Wear suitable protective clothing (Acid Proof). Keep product and emptied container away from heat and sources of ignition. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. Avoid coming into contact with the substance or handling containers without adequate protection. Use water spray to reduce

		vapours or to redirect the movement of the cloud. Segregate the area until complete dispersion of the substance. Avoid contact with ignition sources. Avoid direct contact with the product and do not breathe fumes or vapours. Use the personal protective equipment described in paragraph 8.
	Emergency measures on accidental release	Evacuate personnel to safe areas. Only qualified personnel equipped with suitable protective equipment may intervene. Prevent unauthorised persons entering the zone.
6.2	Environmental precautions	Do not release into the environment. Do not let product enter drains. Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities. Do not contaminate water with the material. Do not contaminate surface water. Do not allow to enter sewers/ surface or ground water. Prevent product from entering drains. If the product contaminates rivers and lakes or drains inform respective authorities. Do not let product enter drains. In case of large spillage the environmental authority should be informed. Soak up with absorbent material (e.g. Vermiculit) and dispose of in accordance with government regulations. Prevent product from entering drains. If the product contaminates rivers and lakes or drains inform respective authorities. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). See section 8.
6.3	Methods and material for containment and cleaning up	Eliminate leaks immediately. Contain and collect spillage with non-combustible absorbent materials, eg sand, earth, vermiculite, diatomaceous earth and dispose of the product in a container for disposal according to local regulations (see section 13). Collect the spilled material and absorbent non-combustible (perlite, vermiculite, or sand) in opened and cleaned containers polyethylene and/or polyethylene buckets. Residues should not be collected in closed containers. Keep contents moist. Residues should not be collected in closed containers. Never return spills in original containers for re-use. Reuse is absolutely not recommended. After collection, aerate and wash the affected area with water, neutralized with sodium carbonate, sodium bicarbonate or sodium hydroxide, before granting access. Large quantities must be diluted with appropriate agents before being sent for disposal. The spreading and disposal of this material, as well as the materials and objects used in the cleaning of the spreading, can be governed by local or national regulations. The user is obliged to identify the relevant regulations. Recovery: Do not re-introduce the recovered product in the original containers for re-use. Collect in suitable containers for disposal. Do not confine. Use anti-spark tools. Elimination: Follow the recommendations of paragraph 13. Never reintroduce the leaked product into original containers. Cover the remainder with inert absorbent (e.g. vermiculite) for disposal. The waste should NOT be confined. Confinement must be avoided. Contact with incompatible substances can cause decomposition at or below SADT. Clear spills. Never return spills in original containers for re-use. Reuse is absolutely not recommended. Collect in suitable containers for disposal. Do not confine. Use anti-spark tools. Elimination: Follow the recommendations of paragraph 13.
6.4	Reference to other sections	For emergency contact information, see Section 1. See Section 8 for information on personal protective equipment and section 13 for waste disposal. See Sections 07, 08, 11, 12 and 13.

SECTION 7: HANDLING AND STORAGE

The information listed in this section contains generic advice and guidance. Refer to the list of Identified Uses in Section 1 for specific information available in the given scenario or exposure scenarios.

7.1 Precautions for safe handling

Technical measures	See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section. For personal protection see section 8. Avoid formation of aerosol. Do not breathe vapours or spray mist. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations. See engineering measures in the CONTROL OF EXPOSURE / INDIVIDUAL PROTECTION section.
Technical measures/Precautions:	
Advice on safe handling	Apply the legislation regarding the Industrial Hygiene/Safety job. During the operation use the individual protective devices. See section 8. Storage and handling precautions applicable to products: Organic peroxides, Liquids, Harmful, Corrosives. Provide appropriate exhaust ventilation at machinery. Provide showers, eye-baths. Provide water supplies near the point of use. Provide self-contained breathing apparatus nearby (for emergency intervention). Provide fire-blanket nearby. Provide electrical earthing of equipment. Prohibit all sources of sparks and ignition - Do not smoke. Smoking, eating and drinking should be prohibited in the application area. Do not swallow. Do not breathe vapours/dust. Avoid contact with skin and eyes. Avoid formation of aerosol. Take precautionary measures against static discharges. Never return any product to the container from which it was originally removed. Provide sufficient air exchange and/or exhaust in work rooms. Avoid confinement. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Smoking, eating and drinking should be prohibited in the application area. Wash thoroughly after handling. For personal protection see section 8. Protect from contamination. Avoid loss and/or disperses. Keep container tightly sealed. Do not mix directly with substances which can start the decomposition process. Do not mix / pollute with other substances that may cause decomposition. Carefully clean the containers used for picking up and decanting. Never reintroduce the peroxide in the original container. Handle the containers carefully. Do not reuse empty containers before they have been cleaned. Before carrying out decanting operations, make sure that no incompatible substance remains in the tank. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid any kind of loss and / or escape. Do not leave the containers open. Provide a self-contained breathing apparatus nearby. Provide a fire blanket nearby. Do not mix / pollute with other substances that may cause decomposition. See also section 8 to refer to the recommended devices. See Section

10. Protect from contamination. For personal protection see section 8. Avoid peroxide refilling into its original container.

Advice on protection against fire and explosion: Use explosion protected equipment. Keep away from sources of ignition - No smoking. No sparking tools should be used. Keep away from reducing agents (e.g. amines), acids, alkalies and heavy metal compounds (e.g. accelerators, driers, metal soaps). Do not cut or weld on or near this container even when empty. Keep away from combustible material. Keep away from heat and sources of ignition. Use only explosion- proof equipment. Keep away from combustible material.

Suitable materials: The Suitable materials which can bear the contact with peroxides, and which are consequently suitable for the construction of peroxides containers, dispensers, etc., are glass or ceramic, polyethylene, High density polyethylene (HDPE), Polytetrafluoroethylene (PTFE), Stainless steel, AISI 304 or 316 stainless steel, the latter before use must be suitably pickled and passivated.

Temperature class: It is recommended to use electrical equipment of temperature group T3. However, autoignition can never be excluded.

Suitable materials: Suitable materials that can come into contact with peroxides, to be used for the construction of containers, dosers, etc., are: glass or ceramic, polyethylene (HDPE), stainless steel AISI 304 or 316; the latter before use must be appropriately pickled and passivated. Recommended: High density polyethylene (HDPE), Polytetrafluoroethylene (PTFE), Stainless steel.

Suggestions against fires ed Explosions: Use only explosion-proof equipment. Keep away from combustible/incompatible substances.

Hygiene measures: Take off immediately all contaminated clothing. Prohibit contact with skin and eyes and inhalation of vapours. When using do not eat, drink or smoke. Wash hands after handling. Remove contaminated clothing and protective equipment before entering eating areas

7.2 Conditions for safe storage, including any incompatibilities

Store in well insulated area (peroxide area) away from other substances. Storage buildings must be built and equipped so as not to exceed the maximum proscribed temperature limit. Use non-combustible construction materials. Keep tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Do not smoke. Keep/Store away from clothing/ combustible materials. Store in original container. Use only very clean containers and equipment free from traces of impurities. Never return unused material to storage receptacle. Do not reuse empty packaging to store other products. Provide earthing and safe electrical equipment. Provide a catch-tank in a bunded area. Provide impermeable floor. Requirements for storage areas and containers: Avoid impurities (e.g. rust, dust, ash), risk of decomposition. Electrical installations / working materials must comply with the technological safety standards. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in original container. Keep containers tightly closed in a cool, well-ventilated place. Store in accordance with the particular national regulations. Restricting access to unauthorized persons. Pay attention to the special requirements of local authorities for handling dangerous goods. Keep the product:

- ✓ Store in accordance with local/national regulations;
- ✓ Keep away from food, drink and animal feeding stuffs;
- ✓ Keep away from sources of ignition - No smoking.
- ✓ Keep away from reducing agents (e.g. amines), acids, alkalies and heavy metal compounds (e.g. accelerators, driers, metal soaps).
- ✓ In original and closed containers; away from flammable materials and incompatible substances.
- ✓ Keep container upright to prevent leakage.
- ✓ Keep away from flammable materials, and incompatible substances.
- ✓ Away from sources of ignition (steam lines, naked flames, sparks, direct sunlight, etc.);
- ✓ Keep only in the original, tightly closed and labeled containers.
- ✓ Do not re-use empty containers to store other products.

In order to keep the product characteristics unaltered for a long time,

- ✓ Store in a dry and well-ventilated area away from sources of heat and sunlight.
- ✓ Store separate from other chemicals.
- ✓ In compliance with local / national regulations, in original and closed containers;
- ✓ Store in a cool, well ventilated position. Keep away from sources of ignition (steam lines, naked flames, sparks, direct sunlight, etc.);
- ✓ Store separate from other chemicals.
- ✓ Store according to applicable local/national legislation in the original and closed tanks;
- ✓ Storage temperature: > -10°C T < 30°C.

Store away from reducing agents (eg amines), acids, alkalis and heavy metal based compounds (eg accelerators, desiccants). Strong oxidizing agents, Strong reducing agents, Strong acids, Bases, Amines, transition metal salts, Sulfur compounds, Rust, ash, powders (risk of self accelerated exothermic decomposition).

Incompatible Materials: Iron, Copper, Brass, Bronze, Aluminum, Zinc, Strong Bases, Oxidizing Agents, Powdered Metals, Strong Oxidizing Agents, Metals, Iron, Copper, Amines, Strong Acids, Reducing Agents, Heavy Metals, Organic Materials, Alcohols , permanganates, for example potassium permanganate, Nickel, Brass, Iron. Incompatible products: Strong oxidizing agents, Strong reducing agents, Strong acids, strong bases, Amines, Acetone, Sulfur compounds, heavy metal compounds, heavy metals, (risk of exothermic decomposition). To avoid: Ordinary metals (ordinary steel), copper, natural or synthetic rubber. See also section 8 to refer to the recommended devices. See Section 10. No degradation occurs if stored under normal conditions.

7.3 Specific end uses: Apart from the uses described in section 1.2 no other specific uses are covered. Recommendations: Observe instructions for use. Consult the technical guidelines for the use of this substance/mixture.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Additional information about design of technical facilities: No further data; see item 7.

8.1 Control parameters

Occupational exposure limits

2 BUTANONE PEROXIDE - CAS 1338-23-4

REACTION MASS OF BUTANE-2,2-DIYL DIHYDROPEROXIDE AND DIOXYDIBUTANE-2,2-DIYL DIHYDROPEROXIDE

Source	Date	Value Type	Value (ppm)	Value (mg/m³)	
OEL (IT)	2009	CEIL	0,2	1,5	–
ACGIH(US)	2012	STEL	0,2	----	GB EH40

2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE CAS 6846-50-0

Source	Date	Value Type	Value (ppm)	Value (mg/m³)	
EH40 WEL	2005	TWA	----	----	–
ACGIH(US)	2005	STEL	----	----	

DIACETONALCOHOL CAS 123-42-2

Source	Date	Value Type	Value (ppm)	Value (mg/m³)	
OEL (IT)	2009	TWA	50	–	–
ACGIH US	02 2012	TWA	50	–	–
EH40 WEL	12 2011	STEL	75	362	
EH40 WEL	12 2011	TWA	50	241	

2 BUTANONE CAS 78-93-3

Source	Date	Value Type	Value (ppm)	Value (mg/m³)	
EH40 WEL	12 2011	SKIN	----	----	
EH40 WEL	12 2011	TWA	200	600	
EH40 WEL	12 2011	STEL	300	899	
EU ELV	12 2009	TWA	200	600	2000/39/CE
EU ELV	12 2009	STEL	300	900	2000/39/CE
OEL (IT)	2009	STEL	300	900	OEL (IT)
OEL (IT)	2009	TWA	200	600	OEL (IT)
GB EH40	2005	STEL	0,2 ppm	1.5 mg/m³	
ACGIH US	02 2012	TWA	200	–	2000/39/CE
ACGIH US	02 2012	STEL	300	–	Source: ACGIH

Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

HYDROGEN PEROXIDE CAS 7722-84-1

Source	Date	Value Type	Value (ppm)	Value (mg/m³)	
EH40 WEL	12 2011	STEL	2	2,8	Source: ACGIH
EH40 WEL	12 2011	TWA	1	1,4	
ACGIH (US)	02 2012	TWA	1	–	–

ACGIH: American Conference of Governmental Industrial Hygienists AGW: Arbeitsplatzgrenzwert BEI: Biological Exposure Index MAC: Maximum Allowable Concentration NIOSH: National Institute for Occupational Safety and Health OEL: OEL: Occupational exposure limit. STEL: Short term exposure limit TRGS: Technische Regel für Gefahrstoffe TWA: Time Weighted Average

Biological limit values

2 BUTANONE PEROXIDE	No biological limit value for exposure
2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE	No biological limit value for exposure
DIACETONE ALCOHOL	No biological limit value for exposure
2 BUTANONE	IBE () 2 mg/l MEK - urine at end of shift butan-2-one: 70 micromol perlitre (Urine)
HYDROGEN PEROXIDE	No biological limit value for exposure

TLV- Threshold Limit value; TWA - Time Weighted Average; STEL - Short Term Exposure Limit; ACGH - American Conference of Governmental Industrial Hygienists. OEL(EU): Occupational Exposure Limit (EU). ACGIH: American Conference of Governmental Industrial Hygienists. AGW: Arbeitsplatzgrenzwert. BEI: Biological Exposure Index. MAC: Maximum Allowable Concentration. NIOSH: National Institute for Occupational Safety and Health. OEL: OEL: Occupational exposure limit. STEL: Short term exposure limit. TRGS: Technische Regel für Gefahrstoffe. TWA: Time Weighted Average. The information in this section contains generic advice and guidance. Refer to the list of Identified Uses in Section 1 for specific information available in the given scenario or exposure scenarios.

***2 BUTANONE PEROXIDE - CAS 1338-23-4* - Derived no Effect Level (DNEL)**

	Inhalation - Via - Route	Oral - Via - Route	Dermal - Via - Route
Workers	5,288 mg/m³ (LT, SE) 15,864 mg/m³ (ST, SE)	----	3 mg/kg bw/day (LT, SE)
Consumers	1,125 mg/m³ (LT, SE)	0,75 mg/kg bw/day (LT, SE)	1,5 mg/kg bw/day (LT, SE)

***2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE CAS 6846-50-0* - Derived no Effect Level (DNEL)**

	Inhalation - Via - Route	Oral - Via - Route	Dermal - Via - Route
Workers	17,62 mg/m³ (LT, SE)	-----	5 mg/kg bw/day (LT, SE)

Consumers	4,35 mg/m³ (LT, SE)	5 mg/kg bw/day (LT, SE)	5 mg/kg bw/day (LT, SE)

DIACETONALCOHOL CAS 123-42-2 **- Derived no Effect Level (DNEL)**

	Inhalation - Via - Route	Oral - Via - Route	Dermal - Via - Route
Workers	240 mg/m³ (ST, LE) 66,4 mg/m³ (LT, SE, LE)	----	9,4 mg/kg bw/day (LT, SE)
Consumers	120 mg/m³ (ST, LE) 11,8 mg/m³ (LT, SE, LE)	3,4 mg/kg bw/day (LT, SE)	3,4 mg/kg bw/day (LT, SE)

2 BUTANONE CAS 78-93-3 **- Derived no Effect Level (DNEL)**

	Inhalation - Via - Route	Oral - Via - Route	Dermal - Via - Route
Workers	600 mg/m³ (LE, ST)	----	1161 mg/kg/giorno (SE, LT)
Consumers	106 mg/m³ (SE, LT)	31 mg/kg/giorno (SE, LT)	412 mg/kg/giorno (SE, LT)

HYDROGEN PEROXIDE CAS 7722-84-1 **- Derived no Effect Level (DNEL)**

	Inhalation - Via - Route	Oral - Via - Route	Dermal - Via - Route
Workers	3 mg/m³ (LE, ST) 1,4 mg/m³ (LE, LT)	----	Qualitative
Consumers	1,93 mg/m³ (LE, ST) 0,21 mg/m³ (LE, LT)	Qualitative	Qualitative

LE: Local Effects. **SE**: Systemic Effects , **LT**: Long Term, **ST**: Short term.
* DNEL has been calculated on the basis of toxicological information provided. Conservatives assessment factors Were used.
Qualitative assessment carried out on the basis ** OC and RMM. *** Qualitative assessment performed is based on OC and RMM (for the risk to the eyes). **** The substance does not meet the criteria to be classified for dermal systemic effects. G.p.: General population.

PNECs - Predicted No Effect Concentration

	2 BUTANONE PEROXIDE	***DIACETONE ALCOHOL***	***2,2,4 – TRIMETIL – 1,3 PENTANDIOLO***
PNEC fresh water (mg/l)	0,0056 mg/l AF: 1000	2 mg/l	0,014 mg/l
PNEC sediment fresh water (mg/kg)	0,0876 mg/kg dw	9,06 mg/kg dw	5,29 mg/kg wwt
PNEC marine water (mg/l)	0,00056 mg/l AF: 10000	0,2 mg/l	0,0014 mg/l
PNEC sediment marine (mg/kg)	0,00876 mg/kg mg/kg dw	0,91 mg/kg dw	0,529 mg/kg wwt
Intermittent releases to water	0,056 mg/l AF: 100	1 mg/l	0,14 mg/l
PNEC Sewage Treatment Plant (mg/l):	1,2 mg/l AF: 10	10 mg/l	3 mg/l mg/kg
PNEC soil (mg/kg):	0,0142 mg/kg dw	0,63 mg/kg dw	0,926
Secondary Poisoning	----	----	83,3 mg/kg

PNECs - Predicted No Effect Concentration

	2 BUTANONE	***HYDROGEN PEROXIDE***
PNEC fresh water (mg/l)	55.8 mg/l	0,0126 mg/l
PNEC sediment fresh water (mg/kg)	284.7 mg/l	0,47 mg/kg
PNEC marine water (mg/l)	55.8 mg/l	0,0126 mg/l
PNEC sediment marine (mg/kg)	284.7 mg/l	0,47 mg/kg
Intermittent releases to water	----	0,0138 mg/l
PNEC Sewage Treatment Plant (mg/l):	709 mg/L	4,66 mg/l
PNEC soil (mg/kg):	55.8 mg/l	0,0126 mg/l
Secondary Poisoning	284.7 mg/l	0,47 mg/kg

8.2 Exposure controls

Use personal protective equipment compliant with the standards set by the relevant European and national regulations. In any case, consult the supplier before making a final decision on the devices to be installed. Explosion proof ventilation recommended. Effective exhaust ventilation system. Ensure that eyewash stations and safety showers are close to the workstation location.

General protective measures: Professional Exposure controls. Technical Measures.

Use in closed processes (for example transfer in closed circuit). The working area shall be provided with suitable ventilation system in order to keep the product concentration rate in the air at a low level. It must be ensured good local ventilation and a good system of air supply. If these measures are not sufficient to maintain concentrations of vapours below the exposure limit, it is necessary to make use of appropriate respiratory protection of the respiratory tract. Emergency-shower and facilities for rinsing eyes must be accessible. Minimize exposure concentrations at the workplace. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the workstation location.

Personal Protective equipment

(a) Skin/Body protection (EN 14605)

Protective clothing, safety apron. Suitable protective footwear. Remove contaminated clothing and wash before re-use.

(b) Hand protection (EN 374)

Wear work gloves impermeable to chemicals in butyl rubber, neoprene, PVC, Nitrile (thickness = 0.5 mm, permeation time > 8 hours - 480 min) (90% protection) [ref. EN 374]. Gloves with adequate chemical resistance tested to EN374 and with specific activity training. However, since the product is a mixture of several substances, the resistance of the glove material must be tested before use, as it is not foreseeable in advance. Check the integrity of the gloves before using them and replace them immediately in case of contamination or breakage. Efficacy Skin Protection: 95%. Material: butyl rubber, Neoprene, synthetic rubber, PVC, glove thickness: 0,5 mm Penetration time:> = 8 h (90% protection). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Wear suitable gloves (EN374) in case of probable hand contact with the substance. Remove product impurities / spills as soon as they appear. Rinse off any contamination

		of the skin immediately. For special applications it is recommended to define the specific resistance to chemicals with the manufacturer of work gloves. Wash hands before breaks and at the end of the working day. Perform basic staff training so that exposure is minimized and possible reporting of skin problems. Check the status before use. Remarks: Wash skin thoroughly after contact. Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous sub-stance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday. Check status before using. Avoid contact with eyes and skin and wear suitable protective gloves when handling and check their condition before use. Gloves should be replaced immediately if there is a noticeable degradation phenomena. Remarks: After contact clean skin carefully.
(c)	Eye/Face protection (EN 166)	Wear eye/face protection during manipulation. Wear tight goggles and / or face shield during transferring. Install emergency eye sources close to the Area of Use. Avoid contact with the eyes and skin.
(d)	Respiratory protection (EN 141, EN 143, 14387)	In case of insufficient ventilation, of dangerous fumes, vapurs or mists wear a self-contained respirator. In the case of dust or aerosol formation use respirator with an approved filter. In case of insufficient ventilation, wear suitable respiratory equipment. Filters for gas / vapors EN 141. Avoid inhalation of vapors and use only in well-ventilated areas. Use self-contained breathing apparatus or masks with an "A" type filter during emergency operations. Under normal conditions of use and under the conditions for use of the product, a respirator is not required. In some situations, such as spray application in industrial environments, the use of respiratory protection is required (eg face mask with NO type cartridge). Check the Exposure scenarios. In case of insufficient ventilation, wear an appropriate respirator equipment: filters for gases / vapors EN 143. Avoid inhalation of vapours. Use only in well-ventilated areas. Use suitable respiratory protective device in case of insufficient ventilation. Use self breathing system or masks with organic vapour filter, type "A" during the emergency. Check Exposure scenarios if they are available. Use suitable respiratory device when it exceed exposure limit and when insufficiently ventilated equipment (respirator with Filter A): European Cartridges Draeger multipurpose type (A2B2E2K1P2) Combination 3M Cartridge / Filter: 60922, 60923 or 60926, 3M multipurpose type (ABEK2P3), 3M Acid Gas (AG) 6002, Organic Vapor / Acid gas (OV / AG) 6003, Multigas (MG / V) 6006. Filter ABEK recommended.
(e)	Hygiene measures	Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday. Wash contaminated clothing before re-use. Remove and wash contaminated clothing before reuse. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.
(f)	Professional Exposure controls. Technical Measures.	Use in closed processes (for example transfer in closed circuit, eg closed loop transfer). Provide local exhaust ventilation or other devices to maintain airborne particle levels below the recommended exposure limits. Set up emergency showers and fountains washes eyes near the product handling areas. Do not eat, drink or smoke during use. Wash hands and other areas of skin exposed to the product after use. Periodically wash work clothing and personal protective equipment to remove contaminants. Handle the product in compliance with the rules of good industrial hygiene
	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, you will need to run the fume scrubbers, filters or engineering modifications to the process equipment to reduce emissions to acceptable levels. Use preferably pumping techniques to deposit or download. Avoid subsoil penetration. Do not contaminate surface water. Prevent product from entering drains. If the product contaminates rivers and lakes or drains inform respective authorities. If the product contaminates rivers and lakes or drains inform respective authorities in accordance with local laws. Do not let product enter drains. Environmental exposure controls: See chapter 6

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

	Characteristic	*Unit of measure*	*Declared value*
a	Appearance: – Physical state (20°C) 1013 hPa	-	Liquid, clear, Colourless, at 20°C and 101.3 kPa
b	Odour	-	Distinctive – 2 Butanone Like - Faint. mint-like
c	Olfactory threshold:	-	No data Available
d	pH	-	Slightly acidic, < 5
e	Melting point/range	°C	< - 20°C at 1013 hPa.
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE		- 70 °C
	4-HYDROXY-4-METHYLPENTANE-2-ONE		- 44 °C.
	METHYLETHYLKETONE		- 86 °C
	HYDROGEN PEROXIDE		- 40,3 °C
f	Boiling point/boiling range	°C	Not determined - Decomposes below the boiling point. Not applicable (decomposes on heating).
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE		281,5 °C
	4-HYDROXY-4-METHYLPENTANE-2-ONE		ca. 168 °C
	METHYLETHYLKETONE		79,6 °C
	HYDROGEN PEROXIDE		ca. 125 °C

g	Flash point	°C	Closed Cup: 78,5 - Penski-Martens closed cup EN ISO 2719. Open Cup: > 75,0°C - Cleveland open cup ASTM D92. > SADT value. The flashpoint of this product is greater than the Self Acceleration Decomposition Temperature.
h	Evaporation rate		Not applicable and/or not determined for the mixture
i	Flammability (solid, gas)		Not applicable and/or not determined for the mixture
	Flammability Liquids		Not applicable and/or not determined for the mixture Decomposition products may be flammable.
j	Lower explosive limit/ Upper explosive limit		Not applicable. Decomposition products may be flammable.
	4-HYDROXY-4-METHYLPENTANE-2-ONE		Lower limit (% vol) 1,8% Upper limit (% vol) 6,9%
	METHYLETHYLKETONE		Lower limit (% vol) 1,8 % (v/v) Upper limit (% vol) 11,5 % (v/v)
k	Vapour pressure	hPa - Pa	1 hPa, a 20 °C - 73.6 Pa Temp. 25°C 1 hPa at 84 °C
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE		< 1,5 Pa, a 25°C
	4-HYDROXY-4-METHYLPENTANE-2-ONE		1.29 hPa at 20°C
	METHYLETHYLKETONE		105 hPa a 20°C
	HYDROGEN PEROXIDE	Total	12 mbar (9.0 mmHg) @ 20°C (68°F) for 50% hydrogen peroxide. 72 mbar (54 mmHg) @ 50°C (122°F) for 50% hydrogen peroxide.
l	Vapour Density		Not applicable and/or not determined for the mixture
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE	Air = 1	9,9
	4-HYDROXY-4-METHYLPENTANE-2-ONE		4,0 Reference substance: Air=1
	HYDROGEN PEROXIDE		1,0 for 50% w/w
m	Density	d 20/20	0,999 - 1,020 (SSC 2010 Promox P250TX)
n	Solubility:		< 15 g/l a 20 °C at 20 °C partly miscible - slightly soluble
	Water solubility		Water solubility: < 10 g/l (6530 mg/L at 20°C)
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE		Water solubility: 0,0033 – 0,0115 g/l
	4-HYDROXY-4-METHYLPENTANE-2-ONE		Fully miscible
	HYDROGEN PEROXIDE		Fully miscible
o	Partition coefficient: n-octanol/water	LogKow/LogPow	
	METHYLETHYLKETONE PEROXIDE REACTION MASS	log Kow	log Kow : < 0,3 (OCDE 117)
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE	log Pow	log Pow: = 4,04 – 4,91
	4-HYDROXY-4-METHYLPENTANE-2-ONE	log Kow	log Kow: = - 0,09.
	HYDROGEN PEROXIDE	log Kow	log Kow: = -1,57 , a 20 °C
p	Auto-ignition temperature:	°C	> 200 °C. Test method not applicable (decomposes on heating).
	2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE		> 200 °C
	METHYLETHYLKETONE		514 °C
	Decomposition temperature SADT		> 60°C
q		°C	SADT - (Self accelerating decomposition temperature) is the lowest temperature at which self accelerating decomposition may occur with a substance in the packaging as used in transport. A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be caused by thermal decomposition at and above the SADT. Contact with incompatible substances can cause decomposition below the SADT.
r	Viscosity OECD 114 (Viscosity of Liquids)	mPa.s (20 °C)	18 - 20 mPa.s, a 20°C. Viscosity, dynamic 14 - 16 mm^2/s a 20 °C. Viscosity, Kinematic.
s	Explosive properties:		Negative. Not explosive. The substance or mixture is an organic peroxide classified as type D.
t	Oxidizing properties:		The substance or mixture is an organic peroxide classified as type D. Not classified as oxidising.
u	Dissociation constant pKa 20°C	pKa	pKa at 20°C: 11.38
	4-HYDROXY-4-METHYLPENTANE-2-ONE		14.57 a 20°C
	HYDROGEN PEROXIDE		11,62 - pKa

9.2 Other information

Characteristic	*Unit of measure*	*Declared value*
Dissociation constant pKa 20°C	pKa	pKa at 20°C: 11.38
Refraction Index		1,434 a 20 °C
SADT (Self Accelerated Decomposition Temp)		> 60°C. SADT - (Self accelerating decomposition temperature) is the lowest temperature at which self accelerating decomposition may occur with a substance in the packaging as used in transport. A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be caused by thermal decomposition at and above the SADT. Contact with incompatible substances can cause decomposition below the SADT.
Surface Tension	mN/m at 20°C	No data Available
Henry's law constant	Pa m^3 mol -1	No data Available

Active oxygen content	%	8,1% – 8,3% w/w
Organic peroxides content	%	30% – 35% w/w
Shelf-life		> 12 Months
Miscibility with Solvents	-	Soluble in: Styrene, Alcohol , Ketones, Esters, Ether, Halogenated hydrocarbons. Hexane and Chloroform < 10 g/l Methanol and Ethyl Acetate > 500 g/l. Miscible with:, Phthalates

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

SECTION 10: STABILITY AND REACTIVITY

10.1	Reactivity	Stable under normal conditions. Stable under recommended storage conditions. The product is stable under normal handling and storage conditions. **This product can react quickly and violently** when mixed with incompatible chemicals or heated. Do not mix directly with metal salts, accelerating agents, acids and alkalis, especially if concentrated, strong reducing agents, sulfur compounds, organic and flammable substances. Respect the conditions of use with: accelerators (amines, metal salts). Avoid contact with rust, iron and Copper. Contact with incompatible materials such as a Acids and bases, Iron, Copper, Reducing agents, Heavy metals, Rust. Do not mix with peroxide accelerators, unless under controlled processing. Organic peroxides. At high temperature: risk of violent reaction (decomposition).
10.2	Chemical stability	Stable under normal conditions. Stable under recommended storage conditions. Under the recommended storage and handling conditions, the Product is stable for at least 12 months from the date of production. No decomposition if used and stored according to specifications. To maintain quality store in original closed container below: 30°C. A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be caused by thermal decomposition at and above the SADT. Contact with incompatible substances can cause decomposition below the SADT.
10.3	Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use. The product is stable under normal storage and use conditions, in this case hazardous reactions will not occur. Organic peroxides. At high temperature: risk of violent reaction (decomposition). The product can decompose rapidly if mixed with incompatible or heated chemicals. The vapors can form an explosive mixture with the air. Do not mix directly with metal salts, accelerators, acids and alkalis, especially if concentrated, reducing products and organic and flammable substances. Incompatible Materials: Strong oxidizing agents, Strong reducing agents, Sulfur compounds, heavy metal compounds, heavy metals (risk of self-accelerated exothermic decomposition), Iron, Copper, Rust. In case of decomposition is observed increase of temperature and emission of fumes. The oxygen that develops during the decomposition, in the event of fire, may contribute to the combustion of flammable substances. Decomposition under the effect of heat. If attacked by fire, it will support combustion. In case of fire and / or explosion do not breathe fumes. In the event of a fire or overheating, an increase in the pressure of the container will occur; this may cause it to burst. Respect the conditions of use with: accelerators (amines, metal salts).
10.4	Conditions to avoid:	Temperatures below - 10 °C. Temperatures above 30°C. Avoid confinement. Confinement must be avoided. Keep away from Heat, flames and sparks. Keep away from heat, hot surfaces, sparks, open flames or other sources of ignition. Not smoking. Keep away from inflammable materials and incompatible materials (refer to SECTION 10.5). Avoid confinement. Keep away from heat and sources of ignition (risk of exothermic decomposition). Keep away from metal salts, metals, accelerators, acids and alkalis, especially in concentrated form, reducing products and organic and flammable substances. Keep away from heat, sources of ignition and incompatible substances (risk of exothermic decomposition). Protect from contamination. Contact with incompatible substances can cause decomposition at or below SADT. Do not mix directly with peroxide accelerators. Store in a cool place away from heat sources or direct sunlight. Use only compatible materials listed in section 7.
10.5	Incompatible materials	Contact with incompatible substances can cause decomposition at or below SADT value. For queries regarding the suitability of other materials please contact the supplier. Do not mix with peroxide accelerators, unless under controlled processing. Use only stainless steel 316, PP, polyethylene or glass-lined equipment. Materials to avoid: Accelerators, strong acids and bases, heavy metals and heavy metal salts, reducing agents. Incompatible materials: Acids and bases, Iron, Copper, Reducing agents, Heavy metals, Rust. Contact, especially if prolonged, with metals, metal ions, alkalis, and reducing agents and organic substances (such as alcohol or terpenes) can provoke the process of self-accelerated decomposition. Other Incompatible materials: Strong oxidizing agents, Strong reducing agents, Acids, Bases, Amines, transition metal salts, Sulfur compounds, Rust, ash, powders (risk of self-accelerated exothermic decomposition). Respect the conditions of use with: accelerators (amines, metal salts).
10.6	Hazardous decomposition products	Through thermal decomposition, formation of very reactive free radicals. Thermal decomposition giving flammable and toxic products: Ethane - Methane - Ethylene, Carbon oxides. Irritant, caustic, flammable, noxious/toxic gases and vapours can develop in the case of fire and decomposition. Carbon oxides, Formic acid, Acetic acid, Propionic acid, Methyl ethyl ketone.
	Thermal decomposition	SADT - (Self accelerating decomposition temperature) is the lowest temperature at which self accelerating decomposition may occur with a substance in the packaging as used in transport. A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be caused by thermal decomposition at and above the SADT. Contact with incompatible substances can cause decomposition below the SADT. SADT 60°C.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects. All available and relevant data on this product and/or the components quoted in section 3 and/or the analogue substances/metabolites have been taken into account for the hazard assessment. Due to its composition and Based on the available information:

Reaction mass of butane-2,2-diyl dihydroperoxide and dioxydibutane-2,2-diyl dihydroperoxide (CAS 1338-23-4)
Acute oral toxicity: Result of the test. Acute oral toxicity: LD50 Oral: 1.070 mg / kg. Species: rats. Method: OECD Test Guideline 401. Harmful if swallowed. From its composition, it must be considered as: Harmful if swallowed. **Acute inhalation toxicity:** Acute inhalation toxicity: LC50 (Rat): 1.5 mg/l. Exposure time: 4 h. Test atmosphere: dust/mist. Harmful if inhaled. Inhalation of vapors by thermal decomposition of the product: Risk of irritation of the respiratory tract. Toxic effects can not be excluded. From its composition, it must be considered as: Harmful if inhaled. **Acute dermal toxicity:** LD50: 4,000 mg / kg. Species: On rabbit. Method: OECD Test Guideline 402. According to its composition : May be harmful in contact with skin. **Skin corrosion/irritation:** Species: Rabbit. Result: Sub-category 1B. Classification: Category 1B. Method: Tested according to Annex V of Directive 67/548/EEC. Skin corrosion/irritation: Causes severe burns. **Serious eye damage/eye irritation:** Species: Rabbit Result: Risk of serious damage to eyes. Classification: Risk of serious damage to eyes. Method: Tested according to Annex V of Directive 67/548/EEC. Serious eye damage/eye irritation: Causes serious eye damage. According to its composition : Causes severe skin burns and eye damage. According to its composition : Causes serious eye damage. **Respiratory or skin sensitisation:** Respiratory sensitisation: Not classified based on available information. Skin sensitisation: Not classified based on available information. Based on available data, the classification criteria are not met. According to its composition, can be considered as : Not a skin sensitizer. **Germ cell mutagenicity:** Genotoxicity in vitro: Ames test Result: negative Genotoxicity in vivo : Not classified due to data which are conclusive although insufficient for classification. Not classified based on available information. Based on available data, the classification criteria are not met. Contains no ingredient considered as genotoxic. **Carcinogenicity:** Not classified based on available information. Based on available data, the classification criteria are not met. No known carcinogenic effect. **Reproductive toxicity:** Based on available data, the classification criteria are not met. Not classifiable based on available information. 2-butanone, oral NOAEL peroxide (rat P / F1) = 50 mg / kg bw / day. Fertility: Based on the available data, it can not be assumed that the substance has a toxic potential for reproduction. Fetal development: Based on the available data, it can not be assumed that the substance has potential for development. Fertility: Based on the available data, it can not be assumed that the substance has a toxic potential for reproduction. Fetal development: Based on the available data, it can not be presumed that the substance has potential for development. Based on the available data, the substance is not suspected of having reprotoxic potential. **Specific target organ toxicity (STOT) - single exposure:** The substance or mixture is not classified as specific target organ toxicant, single exposure. **Specific target organ toxicity (STOT) - repeated exposure:** The substance or mixture is not classified as an intoxicant of a specific target organ, by repeated exposure. **Aspiration hazard:** No aspiration toxicity classification Based on available data, the classification criteria are not met. Not classified based on available information. Further information: No further data available.

Information on toxicological effects: Product information
Reaction mass of butane-2,2-diyl dihydroperoxide and dioxydibutane-2,2-diyl dihydroperoxide (CAS 1338-23-4)
Acute oral toxicity: Result of the test. Acute oral toxicity: LD50 Oral: 1.070 mg / kg. Species: rats. Method: OECD Test Guideline 401. Harmful if swallowed. **Acute inhalation toxicity:** Acute inhalation toxicity: LC50 (Rat): 1.5 mg/l. Exposure time: 4 h. Test atmosphere: dust/mist. Harmful if inhaled. Inhalation of vapors by thermal decomposition of the product: Risk of irritation of the respiratory tract. Toxic effects can not be excluded. **Acute dermal toxicity:** LD50: 4,000 mg / kg. Species: On rabbit. Method: OECD Test Guideline 402. **Skin corrosion/irritation:** Species: Rabbit. Result: Sub-category 1B. Classification: Category 1B. Method: Tested according to Annex V of Directive 67/548/EEC. Skin corrosion/irritation: Causes severe burns. **Serious eye damage/eye irritation:** Species: Rabbit Result: Risk of serious damage to eyes. Classification: Risk of serious damage to eyes. Method: Tested according to Annex V of Directive 67/548/EEC. Serious eye damage/eye irritation: Causes serious eye damage. **Respiratory or skin sensitisation:** Respiratory sensitisation: Not classified based on available information. Skin sensitisation: Not classified based on available information. **Germ cell mutagenicity:** Not classified based on available information. Based on available data, the classification criteria are not met. **Carcinogenicity:** Not classified based on available information. Based on available data, the classification criteria are not met. No known carcinogenic effect. **Reproductive toxicity:** Based on available data, the classification criteria are not met. Not classifiable based on available information. 2-butanone, oral NOAEL peroxide (rat P / F1) = 50 mg / kg bw / day. Fertility: Based on the available data, it can not be assumed that the substance has a toxic potential for reproduction. Fetal development: Based on the available data, it can not be assumed that the substance has potential for development. The hazard statement H361d applies to the product on a content of > 3% w/w of 1-isopropyl-2,2-dimethyltrimethylene diisobutyrate (EC 229-934-9 - CAS 6846-50-0), used as a stabilizing additive of 2-butanone, peroxide (EC 700-954-4 - CAS 1338-23-4). Fetal development: Based on the available data, it can not be presumed that the substance has potential for development. **Specific target organ toxicity (STOT) - single exposure:** The substance or mixture is not classified as an intoxicant of a specific target organ, single exposure. **Specific target organ toxicity (STOT) - repeated exposure:** The substance or mixture is not classified as an intoxicant of a specific target organ, by repeated exposure. **Aspiration hazard:** Based on available data, the classification criteria are not met. Not classified based on available information. Further information: No further data available.

The toxicity data of the individual components of the preparation are:

2 BUTANONE PEROXIDE CAS 1338-23-4
REACTION MASS OF BUTANE-2,2-DIYL DIHYDROPEROXIDE AND DIOXYDIBUTANE-2,2-DIYL DIHYDROPEROXIDE

a	Acute toxicity - Inhalation	LC50 Inhalation (letal dose - rat)	LC50/4 h/Rat: 1,5 mg/l (Method: OECD Test Guideline 403, Aerosol) (In solution in diisobutyl phthalate, 60 %) (Aerosol)
	Acute toxicity - Oral	LD50 Oral (letal dose - rat)	In man: Liver damage, Difficulty in breathing, Abdominal pain, Causes severe digestive tract burns. At high concentrations, Lethal cases reported in man. In animals: LD50/Rat: 1,017 g/kg (Method: OECD Test Guideline 401) (In solution in Dimethyl phthalate, 35 – 39 %)
	Acute toxicity - Dermal	LD50 Skin (letal dose - rat)	LD50/Rabbit: 4 g/kg (Method: OECD Test Guideline 402) (In solution in Dimethyl phthalate, 35 %)
b	Local effects (Corrosion / Irritation / Serious	(rabbit)	In animals: Corrosive to skin (after occlusive contact, Rabbit,

	Skin damage): Skin		Exposure time: 4 h) (In solution in Dimethyl phthalate, 33 %)
c	Local effects (Corrosion / Irritation / Serious eye damage): Eye	(rabbit)	In man: May cause irreversible eye damage. In animals : Severe eye irritation (OECD Test Guideline 405, Rabbit) (In solution in Dimethyl phthalate, 40 - 60 %)
d	Respiratory or skin sensitisation:		Inhalation: No data available. Skin contact: According to its composition, can be considered as : Not a skin sensitizer
e	Mutagenicity:		Contains no ingredient considered as genotoxic
f	Carcinogenicity:		Carcinogenicity: No data available.
g	Reproductive toxicity:		Reproductive/Developmental Effects Screening Assay: Absence of toxic effects on fertility, Effects on newborn, Side effects due to maternal toxicity. NOAEL (Parental toxicity): = 50 mg/kg bw/day NOAEL (Fertility): = 75 mg/kg bw/day NOAEL (Developmental Toxicity): = 50 mg/kg bw/day (Method: OECD Test Guideline 421, Rat, By oral route) (Dissolved in 2,2,4-trimethyl-1,3-pentanedioldiisobutyrate / Diacetone alcohol, 32 %)
h	Specific target organ toxicity STOT: Single exposure:		No data available.
i	Specific target organ toxicity STOT: Repeated exposure:		In animals : By oral route: No specific toxic effects NOAEL= > 150mg/kg bw/day (Method: OECD Test Guideline 408, Rat, 3 months) (Dissolved in 2,2,4- trimethyl-1,3-pentanediol-diisobutyrate / Diacetone alcohol, 31 %)
j	Aspiration hazard:		Not applicable

Potential acute health effects: Inhalation: May emit gases, vapors which are irritating to the respiratory system. Harmful by inhalation. Ingestion: Causes burns to mouth, throat and stomach. Contact with skin: Causes severe burns. Corrosive to the skin. Harmful in contact with skin. Eye contact: Causes serious eye damage, Risk of serious damage to eyes.
Signs and symptoms of exposure: Inhalation: Irritation of the respiratory tract, cough. Ingestion: liver injury, difficulty breathing, abdominal pain, causes severe burns of the digestive tract. Contact with the skin: pain or irritation, redness, possible blistering. Corrosive to the skin. Eye contact: May cause irreversible damage to the eyes.
Other information No data available

2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE - CAS 6846-50-0

a	Acute toxicity - Inhalation	LC50 Inhalation (letal dose - rat)	In animals: No mortality/6 h/Rat: 5,3 mg/l, No specific toxic effects (vapour saturated atmosphere)
	Acute toxicity - Oral	LD50 Oral (letal dose - rat)	In animals: No mortality/Rat: 2 g/kg (Method: OECD Test Guideline 425) , No specific toxic effects
	Acute toxicity - Dermal	LD50 Skin (letal dose - rat)	In animals: No mortality/Rabbit: 2 g/kg (Method: OECD Test Guideline 402), Local irritation
b	Local effects (Corrosion / Irritation / Serious Skin damage): Skin	(Guinea pig)	No skin irritation OECD 404
c	Local effects (Corrosion / Irritation / Serious eye damage): Eye	(Guinea pig)	No eye irritation OECD 405
d	Respiratory or skin sensitisation:		No Sensitization is possible. It does not cause sensitization.
e	Mutagenicity:		OECD 476 (In vitro Mammalian Cell Gene Mutation Test): Negative. EU Method B.13 / 14 (Mutagenicity - Reverse Mutation Test Using Bacteria): Negative. In vitro mammalian chromosome aberration test: Negative.
f	Carcinogenicity:		No data available.
g	Reproductive toxicity:		Effects on fetal development Species: Rabbit. Method of application: Oral Developmental toxicity: NOAEL: 300 mg / kg body weight. Reproductive Toxicity - Evaluation: Some evidence of adverse effects on development, based on experiments on animals. Screening test of effects on reproduction / development: No toxic effect on reproduction NOAEL (Parental toxicity): 750 mg / kg bw / day. NOAEL (Fertility): 750 mg / kg bw / day. NOAEL (Developmental Toxicity): 750 mg / kg bw / day (Method: OCDE 422, Rat, Oral)
h	Specific target organ toxicity STOT: Single exposure:		No data available.
i	Specific target organ toxicity STOT: Repeated exposure:		In animals : By diet: No toxic effect directly extrapolated to humans NOAEL= 750mg/kg bw/day (Method: OECD Test Guideline 408, Rat, 3 months)
j	Aspiration hazard:		No data available.

Potential acute health effects: Inhalation: No data available. Ingestion: No data available. Contact with skin: No data available. Eye contact: No data available.
Signs and symptoms of exposure: Inhalation: No data available. Ingestion: No data available. Contact with skin: No data available. Eye contact: No data available.
Other information No data available

4-HYDROXY-4-METHYLPENTANE-2-ONE - CAS 123-42-2

a	Acute toxicity - Inhalation	LC50 Inhalation (letal dose - rat)	In man : At high vapour/mist concentrations headache, Central nervous system depression, Dizziness, Difficulty in breathing In

			animals : No mortality/4 h/Rat: 7,6 mg/l (Method: OECD Test Guideline 403) (vapour saturated atmosphere)
	Acute toxicity - Oral	LD50 Oral (letal dose - rat)	LD50/Rat: 3.2 ml/kg (Method: OECD Test Guideline 401).
	Acute toxicity - Dermal	LD50 Skin (letal dose - rat)	No mortality/Rat: 2 ml/kg (Method: OECD Test Guideline 402). No specific toxic effects LD50/Rabbit: 13.750 mg/kg. LD50 / Rabbit: 13,750 mg / kg. No mortality / Rat: 2 ml / kg (Method: OECD 402). No specific toxic effects found. LD0 (Rat) : > 1.875 mg / kg. Method: OECD Test Guideline 402.
b	Local effects (Corrosion / Irritation / Serious Skin damage): Skin	(Guinea pig)	Repeated or prolonged exposures may cause skin irritation and dermatitis due to the degreasing properties of the product. No skin irritation (after occlusive contact, Rabbit, Exposure time: 24 Hour).
c	Local effects (Corrosion / Irritation / Serious eye damage): Eye	(Guinea pig)	On humans: slight irritation to the eyes (exposure to vapors 0.48 mg / l). Irritating to eyes (OECD Test Guideline 405, Rabbit)
d	Respiratory or skin sensitisation:		No Sensitization is possible No skin allergies were observed OCDE 406 Guinea Pig Max. Test). Acute inhalation risk: after exposure of 8 hours in an enriched or saturated atmosphere at 20 ° C: no deceased animal.
e	Mutagenicity:		Ames test: negative. Chromosomal aberration test (OECD 471): negative. There are experimental indications about the mutagenicity in vitro. In vitro Ames test: Inactive (Method: OCDE 471) In vitro gene mutation test on mammalian cells: Inactive (OCDE 473). In vitro gene mutation test: Inactive (OCDE 476). In vivo micronucleus test: Inactive (Method: OCDE)
f	Carcinogenicity:		No data available.
g	Reproductive toxicity:		Screening test of effects on reproduction / development: High dose: Effects on fertility and offspring, Side effects due to maternal toxicity. NOAEL (Parental toxicity): 30 - 100 mg / kg bw / day. NOAEL (Fertility): = 300 mg / kg bw / day. NOAEL (Developmental Toxicity): = 300 mg / kg bw / day (Method: OCDE Directive line 422, Rat, Oral).
h	Specific target organ toxicity STOT: Single exposure:		Irritating to nose, throat and respiratory system 100 ppm – 0.48 mg/l. The substance or mixture is classified as intoxicant for a specific target organ, for single exposure, category 3 with respiratory tract irritation. Exposure route: Inhalation Target organs: respiratory tract. Odor threshold: <100 ppm. Irritating to nose, throat and respiratory tract (100 ppm, 0.48 mg / l).
i	Specific target organ toxicity STOT: Repeated exposure:		By oral route: No toxic effect directly extrapolated to humans Target organs: Liver, Kidney, NOAEL= 30 - 100mg/kg bw/day (rat, 6 Weeks). In animals: By inhalation: No toxic effect directly extrapolated to humans. Target organs: Liver, Kidney, NOAEL= 1,041 mg/l (rat, 6 Weeks)
j	Aspiration hazard:		No data available.

Potential Acute Health Effects: Inhalation: At high vapour/mist concentrations headache, Central nervous system depression, Dizziness, Difficulty in breathing. **Ingestion:** No data. **Skin Contact:** Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. **Eye contact:** Mild eye irritation.
Signs and symptoms of exposure. Inhalation: Headache, Central nervous system depression, Dizziness, Difficulty in breathing. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. **Ingestion:** stomach pains. **Skin contact:** Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. **Eye contact:** Mild eye irritation.
Other information No data available

HYDROGEN PEROXIDE – ACQUEOUS STABILIZED SOLUTION CAS 7722-84-1

a	Acute toxicity - Inhalation	LC50 Inhalation (letal dose - rat)	At high vapour/fog concentrations: Risk of pulmonary oedema, Delayed effects possible. In animals: At high vapour/fog concentrations :, Maximum concentration technically possible LC50/4 h/rat: > 0,17 mg/l (Method: OECD 403) (50%). ATE value of 11 mg/l - ATE value is 1,5 mg/l vap. 1,5 mg/l/4h.
	Acute toxicity - Oral	LD50 Oral (letal dose - rat)	Risk of burns to the mouth, oesophagus and stomach, Through rapid liberation of oxygen: Risk of stomach dilation and haemorrhage, can cause severe lesions, Risk of mortality. In animals: (as aqueous solution). LD50/rat: 801 mg/kg (Method: OECD 401) (70%). DL50/Ratto: 1.200 mg/kg (35%). ATE value of 431 mg/kg
	Acute toxicity - Dermal	LD50 Skin (letal dose - rat)	No mortality/rabbit: 6.500 mg/kg (Method: OECD Test Guideline 402) (In solution in water, 70 %). ATE value of 6500 mg/kg (70%).
b	Local effects (Corrosion / Irritation / Serious damage): Skin	(rabbit)	Effects of skin contacts may include: Discolouration, Erythema, Oedema. In animals: (as aqueous solution). Corrosive to skin (After semi-occlusive contact, rabbit, Exposure time: 3 min) (50 - 70%)

			Corrosive to skin (rabbit).
c	Local effects (Corrosion / Irritation / Serious eye damage): Eye	(rabbit)	Corrosive to eyes. In man: May cause irreversible eye damage. In animals: Severe eye irritation (rabbit) (In solution in water, 35%) Corrosive to eyes (rabbit). Risk of serious damage to eyes. Severe eye irritation (rabbit).
d	Respiratory or skin sensitisation:	(Guinea pig)	No Sensitization is possible. Not a skin sensitizer (guinea pig)
e	Mutagenicity:		In vitro: Genotoxic. In vivo: Not genotoxic. In vitro tests showed mutagenic effects: genotoxic. In vivo tests did not show mutagenic effects. Micronucleus test in vivo in mice: Inactive (Method: 474 OECD Test). Testing of DNA repair of rat hepatocytes: Inactive (Method: OECD 486).
f	Carcinogenicity:		Experimentation on animals has not shown clear evidence of carcinogenic effect. Target Organs: duodenum, carcinogenic effect. Dermal, Prolonged exposure, mouse, Animal testing did not show any carcinogenic effects. Did not show carcinogenic effects in animal experiments. Topical applications do not produce skin tumors. Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).
g	Reproductive toxicity:		Based on the available data, the substance is not suspected of having reprotoxic potential. Based on the available data, the substance is not suspected of having developmental toxicity potential.
h	Specific target organ toxicity STOT: Single exposure:		At high vapour/fog concentrations: Irritating to respiratory system. (> 200 ppm). Inhalation, mice, 665 mg/m^3 Remarks: RD 50, Irritating to respiratory system, H2O2 50%.
i	Specific target organ toxicity STOT: Repeated exposure:		Oral, 90 days, rat, Target Organs: Gastrointestinal tract, 300ppm, LOAEL (pure substance). Oral, 90 days, rat, 100 ppm, NOAEL (pure substance) inhalation, 28 days, rat, Target Organs: Respiratory system, 10 ppm, LOAEL, steam (pure substance) inhalation, 28 days, 2 ppm, NOAEL, steam (pure substance). By oral route: Irritation of the gastric mucosa, NOAEL= 26 mg/kg/d (rat, 3 months) (drinking water). Inhalation: Irritation of upper respiratory system, Irritating to nose, Local effects due to an irritant effect, LOAEL= 0,0029 mg/l (Method: OECD Test Guideline 407, rat, Repeated)
j	Aspiration hazard:		No data available.

Potential Acute Health Effects: Inhalation: It can send forth gas vapors that are very irritating for the respiratory system, irritating to the respiratory tract and which can cause inflammation and pulmonary edema, especially if inhaled in aerosol form. Harmful by inhalation. **Ingestion:** Causes burns to mouth, throat and stomach burns to mucous membranes of the mouth, oesophagus and stomach. Harmful if swallowed. Rapid liberation of oxygen, Risk of expansion of the stomach and hemorrhage with possibility of serious lesions, deadly Risk. **Skin Contact:** Causes severe burns. Corrisive. **Eyes Contact:** Causes severe eye damage. Corrisive.

Signs and Symptoms of Exposure: Inhalation: Respiratory tract irritation, cough, dizziness, and sore throat. **Ingestion:** stomach aches, damage to organs. **Skin Contact:** pain or irritation, erythema, necrosis. **Eyes Contact:** irreversible damage.

Other information No data available

For more information on the hazardous components to health, see step 2 and 8. **Not Applicable** Added indication when a chemical / Physics / Toxicology is not adequate to the chemical nature of the substance. Added indication not available when a chemical / Physics / Toxicology has not been determined experimentally, or when the data in the literature do not provide information on the substance / mixture tested. The EC Regulation 1907/2006 and EC 453/2010 Reach establish that the information entered in this section must be in line with those provided in the registration dossier to ECHA.

SECTION 12: ECOLOGICAL INFORMATION

An environmental hazard can not be excluded in the event of unprofessional handling or disposal. The product must be used according to good working practices, avoiding its dispersion into the environment (see also sections 6, 7, 13, 14 and 15). All data available on this product and/or on components listed in section 3 and / or on similar substances have been taken into consideration for the hazard assessment. Toxic to aquatic organisms. Harmful to aquatic life with long lasting effects. Harmful for fish. Harmful for Daphnia. Biodegradability: Result: Not immediately biodegradable. Method: Closed bottle essay. Practically not bioaccumulative. Bioaccumulation: Bioconcentration factor (BCF): 10.3. Not expected considering the low value of the log Pow. Bioaccumulation is unlikely. The substances making up the product do not meet the PBT or vPvB classification criteria set out in Annex XIII of the EC Regulation No. 1907/2006 (REACH). This substance / mixture contains no components considered to be either persistent, bioaccumulative or toxic (PBT), or very persistent and very bioaccumulative (vPvB) at concentrations of 0.1% or higher.

The eco-toxicity data of the individual components of the preparation are:

2 BUTANONE PEROXIDE CAS 1338-23-4
REACTION MASS OF BUTANE-2,2-DIYL DIHYDROPEROXIDE AND DIOXYDIBUTANE-2,2-DIYL DIHYDROPEROXIDE

12.1	Acute toxicity EC50 bacteria	EC10, 30 min (Activated sludge) : 12 mg/l (Method: OECD Test Guideline 209, Test substance: In solution in Dimethyl phthalate)
	Acute toxicity EC50 Algae (Pseudokirchneriella 72h)	ErC50, 72 h (Pseudokirchneriella subcapitata (green algae)) (Method: OECD Test Guideline 201) No effect up to the limit of solubility
	Acute toxicity EC50 crustaceans (Daphnia magna 48h)	EC50, 48 h (Daphnia magna (Water flea)): 39 mg/l (Method: OECD Test Guideline 202, Test substance: In solution in Dimethyl

		phthalate)
	Acute toxicity LC50 fish (poecilia reticulata 96h)	LC50, 96 h (Poecilia reticulata) : 44,2 mg/l (Method: OECD Test Guideline 203, Test substance: In solution in Dimethyl phthalate)
	Acute toxicity ErC50 Aquatic plants:	ErC50, 72 h (Raphidocelis subcapitata) : 5,6 mg/l (Method: OECD Test Guideline 201, Test substance: In solution in Dimethyl phthalate)
	Aquatic toxicity / Long term toxicity: Aquatic invertebrates:	NOEC r, 21 d (Daphnia magna (Water flea)) : 0,7 mg/l (Method: OECD Test Guideline 211, reproduction)
	Aquatic toxicity / Long term toxicity: Aquatic plants	ErC10, 72 h (Raphidocelis subcapitata) : 2,1 mg/l (Method: OECD Test Guideline 201)
12.2	Persistence and degradation	Readily biodegradable: 87 % after 28 d (Method: OECD Test Guideline 301D)
12.3	Bioaccumulation potential	Log Kow : < 0,3 (Method: OCDE - 117) Bioconcentration factor (BCF): 10.3 2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE : Partition coefficient: n-octanol/water: log Kow : 4,04 - 4,91 (Method: calculated) REACTION MASS OF BUTANE-2,2-DIYL DIHYDROPEROXIDE AND DIOXYDIBUTANE-2,2-DIYL DIHYDROPEROXIDE : Partition coefficient: n-octanol/water: log Kow : < 0,3 (Method: OECD Test Guideline 117) 4-HYDROXY-4-METHYLPENTAN-2-ONE : Partition coefficient: n-octanol/water: log Kow : -0,09, calculated) 2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE : Bioconcentration factor (BCF): 195 (23 d, Method: OECD Test Guideline 305, Lepomis macrochirus (Bluegill sunfish)
12.4	Mobility in soil	Soil Mobility in soil: No data Available Vapor pressure: 20 hPa, 20 °C Absorption / desorption: 2,2,4-TRIMETHYL-1,3-PENTANEDIOL IISOBUTYRATE : log Koc: 2,69 - 3,6 (Method: calculated)
12.5	Results of PBT and vPvB assessmen	According to REACH regulation, annex XIII, this mixture contains no substance meeting PBT and vPvB criteria.
12.6	Other information	It contains no substances that reduce the ozone layer.

2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE - CAS 6846-50-0

12.1	Acute toxicity CE50 Algae (Selenastrum capric. 72h)	> 7,49 mg/l ErC50, 72 h (Pseudokirchneriella subcapitata (green algae)) (Method: OECD Test Guideline 201) No effect up to the limit of solubility
	Acute toxicity EC50 crustaceans (Daphnia magna 48h)	> 1,46 mg/l - NOEC: 1.46 mg/l 48 h (Daphnia magna (Water flea)) (Method: US EPA, Immobilization) No effect up to the limit of solubility
	Acute toxicity LC50 crustaceans	> 1,55 mg/l - NOEC: 1.55 mg/l
	Acute toxicity LC50, 96 h (Lepomis macrochirus)	LC50, 96 h (Lepomis macrochirus (Bluegill sunfish)) (Method: OECD Test Guideline 203) No effect up to the limit of solubility
	Acute toxicity ErC50, 72 h (Pseud. subcapitata)	ErC50, 72 h (Pseudokirchneriella subcapitata (green algae)) (Method: OECD Test Guideline 201) No effect up to the limit of solubility
	Acute toxicity LC50 fish (Ciprinide Acqua Dolce 96h)	> 6,00 mg/l - NOEC: 1.55 mg/l
	Acute toxicity LC50 Platelminta	> 1,55 mg/l - NOEC: 1.55 mg/l
	Acute toxicity LC50 Mollusco Gasteropodo (Planorbis)	> 1,55 mg/l - NOEC: 1.55 mg/l
	Tossicità cronica LOEC (Daphnia magna 21d)	LOEC: 0,7 mg/l
	Long term toxicity NOEC, 21 d (Daphnia magna)	NOEC r, 21 d (Daphnia magna (Water flea)) : 0,7 mg/l (Method: OECD Test Guideline 211, reproduction)
12.2	Persistence and degradation	The 10 day time window criterion is not fulfilled.Not readily biodegradable.: 71 % after 28 d (Method: OECD Test Guideline 301 B)
12.3	Bioaccumulation potential	Partition coefficient: n-octanol/water: log Kow : 4,04 - 4,91 (Method: calculated)
12.4	Mobility in soil	Soil log Koc: 2,69 - 3,6 (Method: calculated)
12.5	Results of PBT and vPvB assessmen	According to REACH regulation, annex XIII, this mixture contains no substance meeting PBT and vPvB criteria.
12.6	Other information	It contains no substances that reduce the ozone layer. Stability in water: 2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE : Half-life: 211 d at 25 °C and pH 4. Half-life: > 1 y at 25 °C and pH 7. Half-life: 25 d at 25 °C and pH 9. Method: OECD 111

4-HYDROXY-4-METHYLPENTANE-2-ONE - CAS 123-42-2

12.1	Acute toxicity EC50 bacteria 3h	825 mg/l Growth inhibition 16h
	Acute toxicity EC50 Algae (Pseudokirchneriella 72h)	> 1000 mg/l (Method: OECD 201)
	Acute toxicity EC50 crustaceans (Daphnia magna 48h)	> 1000 mg/l (Method: OECD 202)
	Acute toxicity LC50 fish Danio rerio (zebra fish 96h)	> 100 mg/l (Method: OECD 203)
	Long term toxicity NOEC, 21 d (Daphnia magna)	NOEC, 21 d (Daphnia magna (Water flea)) : >= 100 mg/l (OECD Test 211, Growth inhibition/Reproduction inhibition)
12.2	Persistence and degradation	Readily biodegradable (98.51% 28 days OECD TG 301 D)Log Kow 0.09 Not potentially bioaccumulative

12.3	Bioaccumulation potential	825 mg/l Growth inhibition 16h
12.4	Mobility in soil	Soil Slight adsorption , log Koc: = 0,52
12.5	Results of PBT and vPvB assessmen	According to REACH regulation, annex XIII, this mixture contains no substance meeting PBT and vPvB criteria.
12.6	Other information	It contains no substances that reduce the ozone layer.

HYDROGEN PEROXIDE AQUEOUS SOLUTION - CAS 7722-84-1

12.1	Acute toxicity CE50 Static test Activated sludge (bacteria)	466 mg/l - 30 min (HP100%)
	NOEC Staic Test Skeletonema costatum (Algae)	1,38 mg/l (growth rate) Marine environment
	Acute toxicity CE50 Skeletonema costatum (Algae)	2,62 mg/l (HP 100%), 72 h
	Acute toxicity CE50 Crustacei (Daphnia pulex 48h)	2,40 mg/l, water, Semistatic (HP100%)
	NOEC Flow-through test with Daphnia M. (Crustaceans)	0,63 mg/l - 21 d (HP100%)
	Acute toxicity LC50 fishes (Pimephales promelas)	16.4 mg/l - 96 h (HP100%)
	NOEC, fishes (Pimephales promelas)	NOEC, 96 h, 5 mg/l (HP100%)
12.2	Persistence and degradation	Abiotic degradation: Air, indirect photo-oxidation, t 1/2 24 h Conditions: sensitizer: OH radical. Water, redox, t 1/2 120 h. Conditions: mineral and enzymatic catalysis, fresh water, brackish water. Soil, redox, t 1/2 12 h. Conditions: mineral and enzymatic catalysis. Biodegradation: aerobic, t 1/2 < 2 min Conditions: biological sewage sludge Readily biodegradable. Aerobic, t 1/2 from 0.3 to 5 d Conditions: fresh water Readily biodegradable. Anaerobic Conditions: Soil / sediments not applicable. Aerobic, t 1/2, 12 h Conditions: Soil Readily biodegradable. Readily Biodegradable (28 Days – OECD TG 301 E). The methods for determining biodegradability are not applicable to inorganic substances. Decomposition : few minutes to 24 h.
12.3	Bioaccumulation potential (log pow)	Partition coefficient: n-octanol/water: log Kow : = -1,57 , at 20 °C (Method: calculated)
12.4	Mobility in soil	Soil
12.5	Results of PBT and vPvB assessment	According to REACH regulation, annex XIII, this mixture contains no substance meeting PBT and vPvB criteria
12.6	Other adverse effects	It not contains Substances that deplete the ozone layer.

Results of PBT and vPvB assessment: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher. **Other information:** No Data available.

SECTION 13: DISPOSAL CONSIDERATIONS

For safety measures about handling of excess and residuals see section 7 and 8. It is advisable to dispose the product and the packaging in strict observance with the local rules.

13.1 Waste treatment methods

For safety measures about handling of excess and residuals see section 7 and 8. It is advisable to dispose the product and the packaging in strict observance with the local rules.

Due to the high risk of contamination recycling/recovery is not recommended. Dispose of surplus and non-recyclable products through an authorized company to dispose of waste. This material and its container must be disposed of with a hazardous waste classification in accordance with Directive 2001/118 / EC. Disposal of this product, solutions and any by-products must always be carried out in compliance with the provisions of the law on environmental protection and waste disposal and with the requirements of any relevant local authority. The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Hazardous waste Dispose of contents/container in accordance with local regulation. Do not discharge into drains and / or into the environment; dispose of waste at an authorized waste collection point. Elimination of waste in accordance with regulations (preferably controlled incineration). Residues must be handled and disposed of in accordance with local and national regulations in force. Directive 94/62 / EC, D.L. 22/1997, Consolidated Law 152/2006. Small quantities of product can be disposed of after dilution with inert solvent to obtain an active oxygen content of less than 1 - 1.5%, after which it is possible to neutralize under controlled conditions. For handling and measures in case of accidental dispersion of waste, the indications given in sections 6 and 7 generally apply. Cautele and specific actions must be evaluated in relation to the composition of the waste. Operate according to local and national regulations. For larger quantities users can contact directly with Promox. The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Hazardous waste Dispose of contents/container in accordance with local regulation.

Product - Packaging disposal: The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Empty remaining contents. Dispose of as unused product. Do not burn, or use a cutting torch on, the empty drum. Due to the high risk of contamination recycling/recovery is not recommended. Follow all warnings even after the container is emptied. Hazardous waste Dispose of contents/container in accordance with local regulation. This material and uncleaned packaging must be disposed of as hazardous waste into an authorized waste collection site. Directive 94/62/EC, Directive 2001/118/EC. The

	empty containers must be disposed of as hazardous waste in strict observance with the local and national rules. See Directive 94/62/CE, D.L. 22/1997, DLgs. 152/2006. Do not release into the environment. Destroy packaging by incineration at an approved waste disposal site (in accordance with local and national regulations).
Waste treatment-relevant information:	It is advisable to dispose of the product by combustion in authorized structure. Before starting the combustion procedure, it is recommended to dilute the peroxide with adequate plasticizers. If the product is correctly ignited, it decomposes itself in carbon dioxide and water. Please contact your hazardous waste disposers. For further advice contact Promox S.p.A. Due to the high risk of contamination recycling/recovery is not recommended. It is advisable to contact your authorized disposal company to check the correct EWC-Number (Decision 2001/573 / EC, Directive 2006/12 / EEC, Directive 94/31 / EEC). Please contact your hazardous waste disposers to assign the right EWC-(European waste catalog)-number.
Further Information	For handling and measures in case of accidental spillage of waste, apply in general to the information provided in sections 6 and 7. Cautions and specific actions should be assessed in relation to the composition of the waste. Operate according to local and national regulations.

SECTION 14: TRANSPORT INFORMATION

The product is subject to the provisions of the current legislation governing the transport of dangerous goods by road / rail (ADR / RID), by sea (IMDG Code) and by air (ICAO / IATA). The product has been classified, labeled and packaged in accordance with the ADR requirements and the provisions of the IMDG Code. Regulation of transport includes special provisions for certain classes of dangerous goods packed in limited quantities.

		ADR/RID	ADN/ADNR	IMDG	IATA
14.1		UN 3105	UN 3105	UN 3105	UN 3105
14.2	UN proper Shipping Name	UN 3105, ORGANIC PEROXIDE TYPE D, LIQUID. (METHYLETHYLKETONE PEROXIDE(S), 5.2, P1, D		UN 3105, ORGANIC PEROXIDE TYPE D, LIQUID. (METHYLETHYLKETONE PEROXIDE(S), 5.2, P1.	
14.3	Transport Hazard Class(es): Labelling	**5.2** **5.2**	**5.2** **5.2**	**5.2** **5.2**	**5.2** **5.2**
		5.2 	**5.2** 	**5.2** 	**5.2 + (HEAT)** 
	Classification Code	P1	P1	P1	P1
14.4	Packing Group:	Not Assigned	Not Assigned	Not Assigned	Not Assigned
14.5	Environmental Hazards:	No	No	----	----
	Marine pollutant:	----	----	None	None
14.6	Special Precautions for users:	Attenzione: Perossido Organico		Warning: Organic peroxides Organic Peroxides, Keep Away From Heat	
	Subsidiary risk	----		-----	
	EMS code:	EmS: F-J, S-R			
	ADR/RID Hazard No:	Haz. Id. Number 539	----	----	----
	Tunnel Code	Tunnel Code: **D**	Tunnel Code: **D**	----	----
14.7	Transport in bulk according to Annex II of MARPOL73/78 - IBC Code	Not applicable for product as supplied.		Not applicable for product as supplied.	
	Additional Infomation	----		----	
14.8	Land Transport				
		Classification Code	Packing group	Danger n° (Kemler Code)	Transport category
		P1	----	539	2
	Warning plates Orange	Special provisions	Limited quantity	Excepted quantity	Packing instructions
	539 3105	122 274	125 ml	E0	P520 IBC520
	Tunnel code	Mixed packing provisions	Portable tank and bulk container instructions	Tank codes for ADR tanks	Special provisions for ADR tanks
	(D)	MP4	T23	L4BN(+)	TU3 TU13 TU30 TE12 TA2 TM4
	Vehicle for tank carriage	Special provisions for carriage: Packages	Special provisions for carriage: Loading and unloading		
	AT	V1	CV15 CV22 CV24		
	The product has been classified, labeled and packaged in accordance with the ADR requirements and the provisions of the IMDG Code. The transport regulation includes special provisions for certain classes of dangerous goods packed in limited quantities. Observe the provisions on transport (ADR / RID, IATA / ICAO). In case of accident, refer to the written instructions of transport and chapters 5, 6 and 7 of this MSDS. Special precautions for user see chapter: 6, 7 and 8. Transport regulations				

	include special provisions for certain classes of dangerous goods packed in limited quantities. Special precautions for user see chapter: 6, 7 and 8.

SECTION 15: REGULATORY INFORMATION

15.1	**Safety, health and environmental regulations/legislation specific for the substance or mixture:**	
	Chemical Identity	**Methyl ethyl ketone peroxide < 40% w/w - Phthalates Free plasticizers mixture, in Aliphatic Solvents. Reaction mass of butane-2,2-diyl dihydroperoxide and di-sec-butylhexaoxidane.**
	Labelling in accordance with EC Directives	

Disposal national pertinent:
Major Accident Hazard Legislation Seveso III
Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC. Unless provided for otherwise by local restrictions the product is subject to the requirements for storage facilities above 50 tons.

Dangerous substances Categories in accordance with Regulation (EC) No. 1272/2008		Quantity1	Quantity 2
P6b	P6b SELF-REACTIVE SUBSTANCES AND MIXTURES Self-reactive substances and mixtures, Type C, D, E or F or organic peroxides, Type C, D, E, or F	50 t	200 t

The product contains:

- substances subject to the restriction procedure (Annex XVII) ANNEX XVII
  Conditions of restriction: 3. Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles: Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008:
  - (a) hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F;
  - (b) hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10;
  - (c) hazard class 4.1;
  - (d) hazard class 5.1.

The product does not contain:

- substances of very high concern (SVHC) candidate for authorization
- substances of very high concern (SVHC) under the authorization procedure (Annex XIV)

The product does not contain:

- substances subject to Regulation (EC) No. 649/2012 of the European Parliament and of the Council on the export and import of
- dangerous chemicals.substances subject to Regulation (EC) No. 1005/2009 on substances that reduce the ozone layer.
- Substances subject to Regulation (EC) No 850/2004 on Persistent Organic Pollutants.

According to EC Regulation No. 1907/2006 (REACH).

Water contamination class (WGK - Germany) - Wassergefährdungsklasse - Water hazard class. (German Regulation)
Water hazard class WGK 1 (Wassergefährdungsklasse 1: schwach wassergefährdend) 1: low hazard to waters; 2: hazard to waters; 3: severe hazard to waters. Water hazard class 1 (www.umweltbundesamt.de - 2-Butanone, peroxide (33% in mixture with Phthalic acid dimethyl ester)): slightly hazardous. WGK 1 = not dangerous. Do not place the product undiluted or in large quantities in groundwater, water or sewage. Do not place the product in ground water, in waterways or in wastewater or in sewage treatment plants.

Norms and legislation on health and environment associated to the mixture

- ✓ Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, and following changes.
- ✓ COUNCIL DIRECTIVE 92 / 32 / EEC of 30 April 1992 amending for the seventh time Directive 67/ 548 / EEC on the approximation of the laws, regulations and administrative provisions relating to the classification , packaging and labelling of dangerous substances
- ✓ Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances.
- ✓ Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), and following changes.
- ✓ D.Lgs.334/1999, and following changes.
- ✓ Directive 1999/45/CE of the European parliament and of the council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the ember States relating to the classification, packaging and labelling of dangerous preparations, and following changes.
- ✓ 2000/39/EC : Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
- ✓ COMMISSION DIRECTIVE 2001/60/EC of 7 August 2001 adapting to technical progress Directive 1999/45/EC of the European Parliament and of the Council concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations
- ✓ REGULATION (EC) No 850/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC
- ✓ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, and following changes.
- ✓ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 – Annex XIV "Candidate List" priority substances for inclusion in Annex XIV of REACH (the "Authorization List") and for these substances proposes Annex XIV

entries (i.e. transitional arrangements and, where relevant, exemptions and review periods) to the European Commission, taking into account the opinion of the Member State Committee.
- ✓ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 – Annex XVII, sets out the list of restrictions on the manufacture, placing on the market and use of certain dangerous chemical substances, mixtures and articles.
- ✓ 2006/15/EC : Europe. Indicative occupational exposure limit values
- ✓ Legislative decree 9 April 2008, n. 81, "Implementation of article 1 of law 3 August 2007, n. 123, in matter of protection of the health and the security on the working places", and following changes.
- ✓ Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- ✓ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
- ✓ Regulation (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific Regulation progress.
- ✓ Directive 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.
- ✓ REACH - Candidate List of substances of very high concern for Authorisation. Not Applicable.
- ✓ REGULATION (EC) No 1005/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 September 2009 on substances that deplete the ozone layer
- ✓ (REACH) REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals
- ✓ COMMISSION REGULATION (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals
- ✓ 2017/164/EU : Commission Directive (EU) 2017/164 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU

Additional regulations (European Union):
- ✓ Hazardous Waste Regulations 2005 Applies: The Control of substances Hazardous to Health Regulations 2002 (as ammended) Banned and/or restricted
- ✓ UK REGULATION Chip3: Chemical (Hazard Information and Packaging for Supply) Regulations 2002
- ✓ Material storage : Hazard group: Type 2 - Organic peroxide
- ✓ BGV B4 organische Peroxide. (Germany)
- ✓ BG-Merkblatt M001 beachten (Germany)
- ✓ Produkt unterliegt nicht dem Sprengstoffgesetz (SprengG). (Germany)
- ✓ Gefahrengruppe nach § 3 BGV B4: Ib
- ✓ GB EH40 : UK. EH40 WEL - Workplace Exposure Limits
- ✓ 2000/39/EC / TWA : Limit Value - eight hours
- ✓ 2000/39/EC / STEL : Short term exposure limit
- ✓ 2006/15/EC / TWA : Limit Value - eight hours
- ✓ 2017/164/EU / STEL : Short term exposure limit
- ✓ 2017/164/EU / TWA : Limit Value - eight hours
- ✓ 91/322/EEC / TWA : Limit Value - eight hours
- ✓ GB EH40 / TWA : Long-term exposure limit (8-hour TWA reference period)
- ✓ GB EH40 / STEL : Short-term exposure limit (15-minute reference period)
- ✓ Produkt unterliegt nicht dem Sprengstoffgesetz (SprengG). (Requirements for German regulation) Take note of Directive 92/85 / EEC on the safety and health of pregnant women at work. Take note of Directive 94/33 / EC on the protection of young people at work.
- ✓ Störfallverordnung Anhang I (German regulatory requirements)
- ✓ Take note of Directive 94/33 / EC on the protection of young people at work or more restrictive national regulations, where applicable.

15.2 Chemical Safety Assessment

For the Reaction Mass (Reaction mass of butane-2,2-diyl dihydroperoxide and di-sec-butylhexaoxidane) a risk assessment (CSA) was performed. The CSA is documented in the Chemical Safety Report (CSR) and the final ES are also communicated along the supply chain through the extended SDS. Chemical Safety Assessments have been carried out for these substances: Diacetone alcohol CAS 123-42-2, Methyl ethyl ketone CAS 78-93-3, Hydrogen peroxide solution CAS 7722-84-1. 1-Isopropyl-2,2-dimethyltrimethylene diisobutyrate (CAS 6846-50-0)

SECTION 16: OTHER INFORMATION

MSDS Revision
Revision 06 date 01.12.2018
Full text of R, H, EUH-phrases referred to under sections 2 and 3

H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H242	Heating may cause a fire.
H271	May cause fire or explosion; strong oxidiser.
H302	Harmful if swallowed.
H310	Fatal in contact with skin
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.
H331	Toxic if inhaled
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness
H341	Suspected of causing genetic defects.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
EUH066	Repeated exposure may cause skin dryness or cracking.

Full text of other abbreviations

Acute Tox.	Acute Toxicity
Aquatic Chronic	Aquatic chronic toxicity
Eye Dam.	Serious eye damage
Eye Irrit. :	Eye irritation
Org. Perox. :	Organic peroxides
Ox. Liq. :	Oxidizing liquids
Skin Corr. :	Skin corrosion
Skin Irrit..	Skin irritation
Skin Sens.:	Skin sensitisation
STOT SE :	Specific target organ toxicity - single exposure
STOT RE :	Specific target organ toxicity - STOT - repeated exposure

Key literature references and sources of data:

- Regulation EC No 1272/2008 (CLP) (and subsequent amendments and adaptations).
- Regulation EC No 1907/2006 (REACH) (and subsequent amendments and adaptations).
- REACH registration dossier of the substances mentioned in SECTION 3.2.i
- SDS for raw materials.

Inventories

CH INV	YES. On the inventory, or in compliance with the inventory
TSCA	YES. All chemical substances in this product are either listed on the TSCA Inventory or in compliance with a TSCA Inventory exemption.
DSL	YES. On the inventory, or in compliance with the inventory
AICS	YES. On the inventory, or in compliance with the inventory
NZIoC	YES. On the inventory, or in compliance with the inventory
ENCS	YES. On the inventory, or in compliance with the inventory
ISHL	YES. On the inventory, or in compliance with the inventory
KECI	YES. On the inventory, or in compliance with the inventory
PICCS	YES. On the inventory, or in compliance with the inventory
IECSC	YES. On the inventory, or in compliance with the inventory

Update:

Paragraphs of the safety data sheet that have been updated:

2	Classification and labelling, Most important hazards Additions, Revisions	Additions, Revisions
8	Derived No Effect Level (DNEL), Predicted No Effect Concentration (PNEC), Respiratory protection Additions, Revisions	Additions, Revisions
10	Reactivity Additions	
11	TOXICOLOGICAL INFORMATION	Additions, Revisions
12	ECOLOGICAL INFORMATION	
13	Disposal of packaging	Additions, Revisions
14	TRANSPORT INFORMATION	Additions, Revisions
	General Revisions	Additions, Revisions

REACH REGULATION: This MSDS has been written on 01.12.2018 on the base of how much decided by the Regulation n. 1907/2006 of the 18 December 2006 (REACH) and according to Regulation (EC) N°. 1272/2008. Safety data sheets: according to Regulation (EC) No. 1907/2006. The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. This safety data sheet has been completely updated in compliance to Regulation (EC) No. 1907/2006 and the Regulation (EC) 453/2010/EU. Promox registered MethylEthylKetone Peroxide (CAS 1338-23-4) as Reaction mass of butane-2,2-diyl dihydroperoxide and di-sec-butylhexaoxidane and obtained this registration number: 01-2119514691-43-0005.

Bibliographical references: IUCLID Data set; NIOSH, The Registry of Toxic Effects. ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre, Commission of the European Communities. ACGIH – Reach Registration Dossier reference Number 01-2119514691-43-XXXX. ACGIH - Threshold Limit Values - 2010 edition.

Acronyms

ADN: Accord européen relative au transport international des marchandises dangereuses par voies de navigation intérieures (The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways). **ADR:** Accord européen relative au transport international des marchandises dangereuses par route. The European Agreement concerning the International Carriage of Dangerous Goods by Road. **ASTM:** American Society for Testing and Materials (ASTM). **ACGIH:** American Conference of Governmental Industrial Hygienists; **BCF:** BioConcentration Factor. **BOD:**

Biochemical Oxygen Demand. **BCF: Bioconcentration factor:** A Bioconcentration factor (L/kg) can either be expressed as the ratio of the concentration of a substance in an organism to the concentration in water once a steady state has been achieved (static BCF), or, on a non-equillibrium basis, as the quotient of the uptake and depuration rate constants (dynamic BCF). Static and dynamic BCFs can be equally used for regulatory purposes. The parameter gives an indication of the accumulation potential of a substance.B86. **Bw:** Body weight / Bw, b.w. **CAS:** Chemical Abstracts Service (division of the American Chemical Society) **CL50**: Lethal Concentration 50% **CLP:** Classification, Labelling and Packaging; **COD**: Chemical Oxygen Demand. **CSR:** Chemical Safety Report; **CMR:** Carcinogenic, mutagenic or toxic to reproduction. **CSA:** Chemical Safety Assessment. **DL 50:** Lethal Dose 50%. **DMEL:** Derived Minimum Effect Level **DNEL:** Derived no effect level; **DT50:** Period required for 50 percent dissipation (define method of estimation). **DT50lab:** Period required for 50 percent dissipation, under laboratory conditions (define method of estimation). **DT90:** Period required for 90 percent dissipation (define method of estimation). **DT90field:** Period required for 90 percent dissipation under field conditions (define method of estimation). **EC(0/50/100):** Effective Concentration 0/50/100. **EINECS:** European Inventory of Existing Commercial Chemical Substances. **ESR:** Existing Substances Regulation. **EU:** European Union. **EUSES:** European Union System for the Evaluation of Substances. **GHS:** "Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations. **GLP:** Good Laboratory Practice**. IC50:** Median immobilisation concentration or median inhibitory concentration 1. **IARC:** International Agency for Research on Cancer; **IATA:** International Air Transport Association; **ICAO:** International Civil Aviation Organization; **IC50:** Inhibitor Concentration 50%; **Code IMDG:** International Maritime Dangerous Goods code; **LCLo:** Lethal Concentration Low. **LD** (0/50/100): Lethal Dose 0/50/100; **LOEC:** Lowest Observed Effect Concentration. **L(E)C50 :** Lethal concentration, median. **LOAEL:** Lowest Observed Adverse Effect Level**. LOEC:** Lowest Observed Effect Concentration. **LOEL:** Lowest Observed Effect Level. **Lowest Observed Adverse Effect Concentration (LOAEC):** The Lowest Observed Adverse Effect Concentration is the lowest tested concentration at which there are statistically significant increases in frequency or severity of adverse effects between the exposed population and an appropriate control group. **Lowest Observed Adverse Effect Level (LOAEL):** The Lowest Observed Adverse Effect Level is the lowest tested dose or exposure level at which there are statistically significant increases in frequency or severity of adverse effects between the exposed population and an appropriate control group. **Lowest Observed Effect Concentration (LOEC):** The Lowest Observed Effect Concentration is the lowest tested concentration at which, in a study, a statistically significant effect is observed in the exposed population compared with an appropriate control group. **Lowest Observed Effect Level (LOEL):** The Lowest Observed Effect Level is the lowest tested dose or exposure level at which, in a study, a statistically significant effect is observed in the exposed population compared with an appropriate control group. **N.A**.: No applicable. **N.D.**: Not Available. **NOEC:** No Observed Effect Concentration. **NOEL:** No Observed Effect Level. **No Observed Adverse Effect Concentration (NOAEC):** The No Observed Adverse Effect Concentration is the highest tested concentration at which there are no statistically significant increases in the frequency or severity of adverse effects between the exposed population and an appropriate control group, some effects may be produced at this level, but they are not considered adverse or precursors of adverse effects. **No Observed Adverse Effect Level (NOAEL):** The No Observed Adverse Effect Level is the highest tested dose or exposure level at which there are no statistically significant increases in the frequency or severity of adverse effects between the exposed population and an appropriate control group, some effects may be produced at this level, but they are not considered adverse or precursors of adverse effects. **No Observed Effect Concentration (NOEC):** The No Observed Effect Concentration is the highest tested concentration at which, in a study, no statistically significant effect is observed in the exposed population compared with an appropriate control group. **No Observed Effect Level (NOEL):** The No Observed Effect Level is the hightst tested tested dose or exposure level at which, in a study, no statistically significant effect is observed in the exposed population compared with an appropriate control group. **NOAEL:** No observed adverse effect level**. NOEC:** No observed effect concentration. **NOEL:** No observed effect level. **PBT:** Persistent, bioaccumulative and toxic. **PNOS:** Particulates not Otherwise Specified **PNEC:** Predicted no effect concentration; **RID:** Règlement concernent le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the Intl Transport of Dangerous Goods by Rail); **STEL:** short term exposure limit; **STOT SE:** Specific target organ toxicity – single exposure. **STOT RE:** Specific target organ toxicity – repeated exposure; **ThOD:** Theoretical Oxygen Demand. **TLV:** threshold limit value; **TWA:** Time Weighted Average; **UE:** European Union; **vPvB:** Very persistent very bioaccumulative.

The data and information contained in this safety data sheet are in conformity with the Directives 1967/548 / CEE, 1999/45 / CE, 76/769 / CEE, with the Regulations 1907/2006 / CE (REACH) and 1272/2008 / CE (CLP) and to the provisions of current legislation on the classification, packaging and labeling of hazardous substances and preparations. However, the user is advised to check and comply with specific national, regional and local regulations regarding hazardous activities and environmental protection (eg liquid, solid and gaseous emissions), which are not the subject of this document.

Classification procedure
The classification of the mixture is in general based on calculation methods using substance data, as required by Regulation (EC) No 1272/2008. If for certain classifications data on the mixture is available or for example bridging principles or weight of evidence can be used for classification, this will be indicated in the relevant sections of the Safety Data Sheet. See section 9 for physical chemical properties, section 11 for toxicological information and section 12 for ecological information.

Organic peroxides, Type D: H242: Heating may cause a fire. Based on experimental data.
Based on experimental data. Based on product data or assessment.
Acute toxicity, Category 4: H302: Harmful if swallowed. Based on experimental data.
Skin corrosion, Category 1B: H314: Causes severe skin burns and eye damage. Based on experimental data.
Serious eye damage, Category 1: H318: Causes serious eye damage. Based on experimental data.
Acute toxicity, Category 4: H332: Harmful if inhaled. Based on experimental data.
Reproductive toxicity, Category 2. H361d: Suspected of damaging the unborn child. Calculation method.
Chronic aquatic toxicity, 3, H412: Harmful to aquatic life with long lasting effects. Calculation method.

This information applies to the Product as Such and conforming to specifications of Promox Spa. In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear. The information contained is based on our knowledge of the product, at the date of publishing and it is given quite sincerely. Users are advised of possible additional hazards when the product is used in applications for which it was not intended. This sheet shall only be used and reproduced for prevention and security purposes. The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive. It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product. It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment. These information's given are designed only as a guidance for safe use, storage, transport and disposal of the product in the most correct and secure. It is not possible to ensure that these instructions are sufficient and / or valid in all cases, some data are still under review, their character is for informational purposes only, do not constitute a guarantee for any specific product features and shall not establish any contractual legal relationship. The references to legislative, regulatory and codes should not be considered as exhaustive. For any further information, users may directly contact the Promox Regulatory Affairs Office and/or Promox Technical Service.

The present Safety Data Sheet has been revised in all of its sections and Conforms to EC Regulation 1272/2008 and EU Regulation 453/2010. The present edition replaces any previous edition. Changes effected in comparison to the previous edition: Introduction criterions and changes in conformity to the EC Regulation 1907/2006 - 1272/2008 and following changes.

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Historical	**Revision date**	**Print date**	**Department issuing MSDS – Object: MSDS**
Revision 06	01.12.2018	01.12.2018	gabriele.minotti@promox.eu

End of Safety Data Sheet

General indications: For requests relating to the addition of non-existing uses or extensions of exposure scenarios, please contact the following e-mail address: info@promox.eu. All identified uses are collected in a table. The connection to the exposure scenarios listed below is followed by the progressive numbers of the exposure scenarios shown in the table. Identified uses with exposure scenarios: Conditions for safe use, and possibly more precise indications on the categories, can be found in the related exposure scenarios to the right (ES). Please note: Exposure scenarios generally refer only to individual registered ingredients and their use. Mixtures may contain other hazardous substances that require additional measures.

Exposure scenarios 9.1 to 9.4 have been calculated using EasyTRA 4.1.0. EasyTRA uses algorithms on the basis of the latest versions of the ECHA REACH Guidance chapters R12 (as of March 2010), R14, R15, and R16 (as of October 2012) and EUSES®. EasyTRA is a graphical user interface which works in compliance with ECETOC® Targeted Risk Assessment 3 (as of July 2012; for detailed

information see ECETOC Technical Report No. 114) for the calculation of worker and consumer exposure and complies with EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a for the environmental exposure (see ECHA REACH Guidance chapter R16.6.2). Results obtained by EasyTRA are routinely validated against the results obtained by performing the same calculations with the original tools.

Details on used Targeted Risk Assessment:
Exposure assessment in EasyTRA follows a tiered approach, offering increasingly sophisticated refinements at later tiers to adapt the scenarios to real-life situations. The Tier 1 assessments (reduced number of parameters, conservative results) refer to ECETOC TRA v3, 2012 for the consumer, worker and environmental exposure assessment. The Tier 2 assessments refer to ConsExpo 4.1 model for consumer exposure assessment or EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a for the calculation of environmental exposure (EUSES), including full access to all EUSES parameters as a third step in the refinement. EasyTRA can also perform a qualitative assessment, following ECHA Guidance Part E or externally calculated values can be considered. EasyTRA offers the options to generate user defined spERCs, article and product categories as a first refinement in the exposure calculations, before switching to higher Tier tools. The following modifications are possible for the worker exposure assessment, that are already suggested in the ECETOC TRA guidance document TR114: Factor for Peak exposure, use of the exact concentration instead of ECETOCs category approach, and use of the exact process duration instead of ECETOCs category approach. In addition, the exact value for the effectiveness of specific types of respiratory protection can be entered. Values originate from EU standards DIN EN136, EN140, EN143, EN149, EN12941, EN12942. All deviations require mandatory justifications, which are documented in the CSR to assure full transparency of the calculations and underlying assumptions.

Human health - Worker

Acute/short term exposure
Peak exposure is considered to be not relevant for the identified use scenarios. Thus, the occupational conditions (OC) and risk management measures (RMM) which have been implemented to control long term exposure are also sufficient to control acute/short term exposure. Consequently, a quantitative assessment of acute/short term exposure and the subsequent risk assessment are not needed and have not been included in chapter 9 and 10 of the CSR.

Long term exposure
A quantitative risk assessment has been performed in chapter 9 and 10 for those exposure scenarios for which a DNEL has been derived, i.e. systemic effects after long term inhalation and dermal exposure.
As DNELs for local effects on skin and eyes could not be established on the basis of the existing data, the risk arising from these effects can only be assessed qualitatively. Due to its corrosive properties the substance has been assigned to the “moderate hazard category”. The PROC-specific OCs and RMMs, which are listed in the chapter 9 tables describing the exposure scenarios, have been selected in line with the recommendations given in the ECHA Guidance on IR&CSR, Part E for this category. They are found to provide adequate control. If the manufacturer/user complies with these conditions and measurements the likelihood of effects due to the corrosive potential of the substance is avoided.

Overview of exposure scenarios

The format of this CSR follows the current ECHA template for CSRs. A comprehensive EasyTRA report documenting all details on used algorithms, defaults and specific use or environmental conditions is attached to this CSR for all scenarios that have been generated using EasyTRA.

	Overview on exposure scenarios and coverage of substance life cycle							
ES number	**Short description of exposure scenario**	**Resulting life cycle stage**	**Sector of use (SU)**	**Process Category**	**Product Category (PC)**	**Article Category (AC)**	**Environmental Release Category**	**Volume (tonnes)**

		Manufacture	Formulation	End use			Service life (for articles)						
				Industrial	Professional	Consumer							
9.1	Manufacturing of the substance (1)	x		x					1, 2, 3, 4, 5, 8A, 8B, 9			1	0
9.2	Formulation of preparations (2)		x	x				3	1, 2, 3, 4, 5, 8A, 8B, 9			2	5000
9.3	Industrial use of reactive processing aids (3)			x				3	1, 2, 3, 4, 5, 7, 8A, 8B, 9, 10, 13, 14			6B	2500
9.4	Industrial use of chemicals for polymer processing (4)			x				3	1, 2, 3, 4, 5, 7, 8A, 8B, 9, 10, 13, 14			6D	2500

Manufacturing of MEKP (ERC1) - ES1- M1 – PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
ERC1: Manufactoring of substances. PROC 1 - Use in closed process, no likelihood of exposure. PROC 2 - Use in closed, continuous process with occasional controlled exposure. PROC 3 - Use in closed batch process (synthesis or formulation). PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact). PROC 8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities. PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 -

ES1

Transfer of chemicals into small containers (dedicated filling line). SU: Not Applicable. PC: Not Applicable

Use as intermediate: SU3 - ERC1, ERC6a - PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9 - SU8, SU9 - PC19.
SU3 (Industrial uses: uses of substances as such or in preparations * at industrial sites). ERC1 Substance production, ERC6a Industrial use resulting in the production of another substance (use of intermediates). PROC 1 - Use in closed process, no likelihood of exposure. PROC 2 - Use in closed, continuous process with occasional controlled exposure. PROC 3 - Use in closed batch process (synthesis or formulation). PROC 8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities. PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line). SU8 Production of large-scale basic chemicals (including petroleum products) SU9 Manufacture of fine chemicals. PC19: Intermediate substances.

Formulation di MEKP (Erc2 – Erc3) - ES2 - F2 - PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
ERC2: Formulation of preparations. ERC3: Article Formulation. PROC 1 - Use in closed process, no likelihood of exposure. PROC 2 - Use in closed, continuous process with occasional controlled exposure. PROC 3 - Use in closed batch process (synthesis or formulation). PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact). PROC 8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities. PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities. PROC 9 - Transfer of chemicals into small containers (dedicated filling line) SU: Not Applicable. PC: Not Applicable **ES2**

Industrial Use MEKP (Erc6b, Erc6d) – ES3 – F3 PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. ERC6b: Industrial use of reactive treatment products. ERC6d: Production of resins / tires. PROC 1 - Use in closed process, no likelihood of exposure. PROC 2 - Use in closed, continuous process with occasional controlled exposure. PROC 3 - Use in closed batch process (synthesis or formulation). PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact). PROC 7 - Industrial spraying. PROC 8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities. PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities. PROC 9 - Transfer of chemicals into small containers (dedicated filling line). PROC 10 - Roller application or brushing. PROC 13 - Treatment of articles by dipping and pouring. PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation SU: Not Applicable. PC: Not Applicable **ES3**

Uso Professionale MEKP (Erc8b, Erc8e) – ES4 - PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15.
ERC8b: Wide and dispersive indoor use of reagent substances in open systems. ERC8e: Wide and dispersive outdoor use of reacting substances in open systems. PROC 1 - Use in closed process, no likelihood of exposure. PROC 2 - Use in closed, continuous process with occasional controlled exposure. PROC 3 - Use in closed batch process (synthesis or formulation). PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact). PROC 7 - Industrial spraying. PROC 8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities. PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities. PROC 9 - Transfer of chemicals into small containers (dedicated filling line). PROC 10 - Roller application or brushing. PROC 13 - Treatment of articles by dipping and pouring. PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation **SU: SU22:** Professional use. **PC:** Not Applicable. **ES4**

1. ES 1: Brief title of the exposure scenario: Manufacture of MeK Peroxide.

Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.

1.1. Title section: Environmental release categories: CES 01: Manufacture of MeK Peroxide. ERC1

Lifecycle stage: Manufacturing Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) Environmental scenarios: 1 (ERC 1)

Lavoratori - Workers

1.2.0 Conditions of use that affect exposure

1.2.1 Controllo dell'Esposizione Produzione MEKP – Exposure Control Production MEKP - Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1).

Qualitative Risk Assessment – PROC1 Contributing Scenario controlling industrial worker exposure for PROC 1

Process category: PROC 1 Use in closed process, no likelihood of exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. General: Assumes a good level of hygiene in the workplace. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to verify that the risk management measures (RMMs) and that the operational conditions (OCs) are used correctly. Eyes - Specification: Use appropriate eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 hours (default) Frequency of use 5 days/week. Max 220 days/Year.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation: Not foreseen.

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Gloves: 80%, burst-time:> 4 hours (default). Wear chemical-resistant gloves according to EN374 with permeation time > 480 minutes. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.) Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.3.0 Conditions of use that affect exposure

1.3.1 Controllo dell'Esposizione Produzione MEKP – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC2: Use in closed, continuous process with occasional controlled exposure

Process category: PROC 2 Use in closed, continuous process with occasional controlled exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. General: Assumes a good level of hygiene in the workplace. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to verify that the risk management measures (RMMs) and that the operational conditions (OCs) are used correctly. Eyes - Specification: Use appropriate eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 hours (default) Frequency of use 5 days/week. Max 220 days/Year.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact

with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Gloves: 80%, burst-time: > 4 hours (default). Wear chemical-resistant gloves according to EN374 with permeation time > 480 minutes. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.) Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.4.0 Conditions of use that affect exposure

1.4.1 Control of Exposure - Production MEKP – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC3: Use in closed batch process (synthesis or formulation)

Process category: PROC 3 Use in closed batch process (synthesis or formulation) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV se of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. General: Assumes a good level of hygiene in the workplace. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to verify that the risk management measures (RMMs) and that the operational conditions (OCs) are used correctly. Eyes - Specification: Use appropriate eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 hours (default) Frequency of use 5 days/week. Max 220 days/Year.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Gloves: 80%, burst-time: > 4 hours (default). Wear chemical-resistant gloves according to EN374 with permeation time > 480 minutes. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.) Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.5.0 Conditions of use that affect exposure

1.5.1 Control of Exposure - Production MEKP – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Process category: PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. General: Assumes a good level of hygiene in the workplace.

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to verify that the risk management measures (RMMs) and that the operational conditions (OCs) are used correctly. Eyes - Specification: Use appropriate eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 hours (default) Frequency of use 5 days/week. Max 220 days/Year.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Gloves: 90 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with 'basic' employee training.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.6.0 Conditions of use that affect exposure

1.6.1 Control of Exposure MEKP production – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC5: Mixing or blending in batch processes (multistage and/or significant contact)

Process category: PROC 5 Mixing or blending in batch processes (multistage and/or significant contact) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. General: Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 hours (default) Frequency of use 5 days/week. Max 220 days/Year.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Gloves: 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.7.0 Conditions of use that affect exposure

1.7.1 Control of Exposure MEKP production – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities

Process category: PROC 8a Transfer of chemicals from/to vessels/large containers at non dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. General: Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity 300 min/day Frequency of use 5 days/week. Max 220 days/Year. 300 min/day, duration of activity has been considered linearly (justification: Do not carry out activity for more than 300 min/day.)

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.) Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.8.1 Control of Exposure MEKP production – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC8b: Transfer of chemicals from/to vessels/ large containers at dedicated facilities

Process category: PROC 8b Transfer of chemicals from/to vessels/large containers at dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 h/day Frequency of use 5 days/week. Max 220 days/Year.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 95 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 90 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with 'basic' employee training.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.9.1 Control of Exposure MEKP production – Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC9: Transfer of chemicals into small containers (dedicated filling line)

Process category: PROC 9 Transfer of chemicals into small containers (dedicated filling line) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity 240 min/day Frequency of use 5 days/week. Max 220 days/Year. 240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity for more than 240 min/day.)

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

2.0.1 Contributing Scenario (1) controlling environmental exposure for ERC 1

Sector of Use: No Applicable. Process Category: **PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.**
Environmental release category: ERC 1 Production of chemicals

Annual site tonnage

1500 Ton/year. 12.5 kg/day.

Frequency and duration of use

Continuous, 220 days / year. Biodegradable product with reserve.

Environmental factors not influenced by risk management

- Local freshwater dilution factor 10
- Local marine water dilution factor 100
- Release fraction to air from process 5 %
- Release fraction to wastewater from process 6 %
- Release fraction to soil from process 0.010 %
- Fraction tonnage to region 100 %
- Fraction used at main source 100 %

- STP yes (municipal)
- River flow rate 18000 m3/day
- Municipal sewage treatment plant discharge 2000000 L/day

Other given operational conditions that influence environmental exposure

Residual waste sludge and washing solutions are disposed of by incineration. The substance is highly reactive. The substance decomposes forming inert organic molecules such as alcohols, ketones and hydrocarbons.

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

The release of the substance in air and in the ground is practically excluded. Production takes place in a closed system with the relative abatement systems except for the packaging phase (Bagging).

Technical conditions and measures at the site to reduce or limit discharges, air emissions and releases to soil

Install local ventilation systems (99% removal efficiency). In case of necessity to provide biological treatment of waste water with Off-Gas technology (Adsorpion unit), use catalytic purification systems off-gas clearing system at the production site level (emission removal efficiency 99.85%).

Organizational measures to prevent/limit release from site

Properly trained staff. Periodically monitor waste and solid waste discharges, if any. Avoid penetration into the subsoil. Do not allow the material to contaminate the water / groundwater. Do not allow product to enter the drains. In the case of pollution of rivers, lakes or sewers, inform the competent authorities.

Conditions and measures related to municipal sewage treatment plant

2000 m^3/days.

Conditions and measures related to external treatment of waste for disposal.

Dispose of waste and containers in cooperation with the relevant waste disposal authorities and in accordance with disposal regulations.

Conditions and measures related to external recovery of waste

None in particular.

3.0.0 Exposure estimation
EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a.

3.0.1 Exposure estimation Environmental – MEKP Manufactoring - ERC1- (EUSES v 2.1.1)

Protection target	PEC	PNEC	RCR = PEC/ PNEC	MSafe kg/d
Air (mg/m^3)	-----	-----	-----	-----
Fresh water (mg/l)	0.004653 mg/L	0.0056 mg/L	0.830834	15.045
Fresh water sediment (mg/kg/wwt)	0.072783 mg/kgdwt	0.0876 mg/kgdwt	0.830859	15.045
Marine water (mg/l)	0.000465 mg/L	0.00056 mg/L	0.830822	15.045
Marine water sediment (mg/kg/wwt)	0.007278 mg/kgdwt	0.00876 mg/kgdwt	0.830847	15.045
Soil 30 days mg/Kg/wwt	0.012262 mg/kgdwt	0.0142 mg/kgdwt	0.863488	14.476
WWTP (mg/l)	0.046525 mg/L	1.2 mg/L	0.038771	322.406
Acqua – Rilascio intermittente	-----	-----	-----	-----
Secondary Poisoning	-----	-----	-----	-----

3.0.2 Exposure estimation Workers – Industrial – MEKP Manufactoring

3.0.1 Contributing Scenario (2) controlling industrial worker exposure for PROC 1

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.006857 mg/kgbw/day	3 mg/kgbw/day	0.002286
inhalation, long-term syst.	0.069239 mg/m^3	5.288 mg/m^3	0.013094
Combined routes	0.016748 mg/kgbw/day	-	0.015379

3.0.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.274286 mg/kgbw/day	3 mg/kgbw/day	0.091429
inhalation, long-term syst.	0.692385 mg/m^3	5.288 mg/m^3	0.130935
Combined routes	0.373198 mg/kgbw/day	-	0.222364

3.0.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 3

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.137143 mg/kgbw/day	3 mg/kgbw/day	0.045714

inhalation, long-term syst.	2.077 mg/ m^3	5.288 mg/ m^3	0.392806
Combined routes	0.433879 mg/kgbw/day	-	0.43852

3.0.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 4

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	3.462 mg/m^3	5.288 mg/ m^3	0.654676
Combined routes	1.18 mg/kgbw/day	-	0.883247

3.0.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 5

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	3.462 mg/m^3	5.288 mg/m^3	0.654676
Combined routes	1.18 mg/kgbw/day	-	0.883247

3.0.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 8a

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.428571 mg/kgbw/day	3 mg/kgbw/day	0.142857
inhalation, long-term syst.	4.327 mg/m^3	5.288 mg/m^3	0.818345
Combined routes	1.047 mg/kgbw/day	-	0.961202

3.0.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 8b

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.619 mg/kgbw/day	-	0.784481

3.0.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 9

Combined total exposure (Inhalation and Dermal) Evaluation carried out with PPE previously described.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.932995 mg/kgbw/day	-	0.555909

Tier 1 Exposure Estimations / Risk Assessments Workers					
Scenario name	**Inhalative Exposure Estimate**	**Dermal Exposure Estimate**	**Risk Characterization Ratio - Inhalation**	**Risk Characterization Ratio - Dermal**	**Risk Characterization Ratio - Total**

1. 1 Manufacturing of the substance	0.069239[3]	0.034286[3] mg/kg/day	0.013094	0.011429	0.024522
2. 1 Manufacturing of the substance	0.692385[3]	1.371[3] mg/kg/day	0.130935	0.457143	0.588078
3. 1 Manufacturing of the substance	2.077[3]	0.685714[3] mg/kg/day	0.392806	0.228571	0.621377
4. 1 Manufacturing of the substance	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940
5. 1 Manufacturing of the substance	3.462[3]	13.714[3] mg/kg/day	0.654676	4.571	5.226
6. 1 Manufacturing of the substance	6.924[3]	13.714[3] mg/kg/day	1.309	4.571	5.881
7. 1 Manufacturing of the substance	1.731[3]	13.714[3] mg/kg/day	0.327338	4.571	4.899
8. 1 Manufacturing of the substance	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic 4 Longterm local 5 Shortterm systemic 6 Shortterm local

Tier 2 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
1. 1 Manufacturing of the substance	0.069239[3]	0.006857[3] mg/kg/day	0.013094	0.002286	0.015379
2. 1 Manufacturing of the substance	0.692385[3]	0.274286[3] mg/kg/day	0.130935	0.091429	0.222364
3. 1 Manufacturing of the substance	2.077[3]	0.137143[3] mg/kg/day	0.392806	0.045714	0.43852
4. 1 Manufacturing of the substance	3.462[3]	0.685714[3] mg/kg/day	0.654676	0.228571	0.883247
5. 1 Manufacturing of the substance	3.462[3]	0.685714[3] mg/kg/day	0.654676	0.228571	0.883247
6. 1 Manufacturing of the substance	4.327[3]	0.428571[3] mg/kg/day	0.818345	0.142857	0.961202
7. 1 Manufacturing of the substance	1.731[3]	1.371[3] mg/kg/day	0.327338	0.457143	0.784481
8. 1 Manufacturing of the substance	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.228571	0.555909

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic. 4 Longterm local. 5 Shortterm systemic 6 Shortterm local

Tier 2 Environmental Risk Assessments

Scenario name	RCR in STP	RCR for local freshwater	RCR for local freshwater sediment	RCR for local terrestrial environment	RCR for local marine water	RCR for local marine sediments	RCR fo humans via the environment
1. 1 Manufacturing	0.038771	0.830834	0.830859	0.863488	0.830822	0.830847	-

of the substance							

4.0.0 Guidance to check compliance with the Exposure Scenario

The predicted exposure does not exceed the DNEL / DMELs values and PEC / PNEC values if the risk management measures/ operational conditions are applied as described in Section 2. The available data on the risks do not allow to derive a DNEL for dermal irritant effects. The risk management measures are based on qualitative risk characterization for Dermal. If measures are taken to risk management / operating conditions different from those described above, users should ensure that those practices are at least an equivalent level. Unless otherwise stated, for the evaluation of the exposures on the job site was used as ECETOC TRA tool for the assessment of exposure to the environment has been used the tool EUSES.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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html - http//www.advancedreachtool.com - http//www.esig.org) [DSU4].

1. ES 2: Brief title of the exposure scenario:
Formulation of preparations MeK Peroxide.
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
1.1. Title section Environmental release categories: CES 02: Formulation of preparations MeK Peroxide - ERC6b
Lavoratori - Workers

1.2.0 Conditions of use that affect exposure

1.2.1 Controllo dell'Esposizione Formulazioni di preparazioni a Base di MEKP – Formulation of preparations MeK Peroxide.
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
Lifecycle stage: Formulation of preparations MeK Peroxide - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9)
Environmental scenarios: 2 (ERC 2)

Qualitative Risk Assessment – PROC1 Use in closed process, no likelihood of exposure

Process category: PROC 1 Use in closed process, no likelihood of exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters. An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure. The following scenarios contribute to the scenario Formulation of preparations. The corresponding release to the environment, exposure of workers and consumers resulting from these contributing scenarios is summarized. Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes. Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 h Frequency of use 5 days/week.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation no

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.3.0 Conditions of use that affect exposure

1.3.1 Contributing Scenario controlling industrial worker exposure for PROC 2
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 2 (ERC 2)

Qualitative Risk Assessment – PROC2 Use in closed, continuous process with occasional controlled exposure

Process category: PROC 2 Use in closed, continuous process with occasional controlled exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed Eyes. Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 h Frequency of use 5 days/week.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.4.0 Conditions of use that affect exposure

1.4.1 Contributing Scenario controlling industrial worker exposure for PROC 3
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 2 (ERC 2)

Qualitative Risk Assessment – PROC3: Use in closed batch process (synthesis or formulation)

Process category: PROC 3 Use in closed batch process (synthesis or formulation) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes. Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Duration of activity > 4 h Frequency of use 5 days/week.

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.5.0 Conditions of use that affect exposure

1.5.1 Contributing Scenario controlling industrial worker exposure for PROC 4
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 2 (ERC 2)
Qualitative Risk Assessment – PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Process category: PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. General: Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to

check that the RMMs in place are being used correctly and OCs followed

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity for more than 240 min/day.)

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.6.0 Conditions of use that affect exposure

1.6.1 Contributing Scenario controlling industrial worker exposure for PROC 5. Formulation of preparations MeK Peroxide. Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 2 (ERC 2)

Qualitative Risk Assessment – PROC5: Mixing or blending in batch processes (multistage and/or significant contact)

Process category: PROC 5 Mixing or blending in batch processes (multistage and/or significant contact) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: NomSubstance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No General: Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity for more than 240 min/day.)

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately

after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.7.0 Conditions of use that affect exposure

1.7.1 Contributing Scenario (controlling industrial worker exposure for PROC 8A
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 2 (ERC 2)
Qualitative Risk Assessment – PROC8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities

Process category: PROC 8a Transfer of chemicals from/to vessels/large containers at non dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No
General: Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 300 min/day, duration of activity has been considered linearly (justification: Do not carry out activity for more than 300 min/day.)

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.8.0 Conditions of use that affect exposure

1.8.1 Contributing Scenario (8) controlling industrial worker exposure for PROC 8B
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 2 (ERC 2)
Qualitative Risk Assessment – PROC8b: Transfer of chemicals from/to vessels/ large containers at dedicated facilities.

Process category: PROC 8b Transfer of chemicals from/to vessels/large containers at dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No
General: Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max > 4 hours/day, duration of activity has been considered linearly

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 90 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with 'basic' employee training.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.9.1 Contributing Scenario controlling industrial worker exposure for PROC 9
Workers Contributing scenario that controls the exposure of the person in charge for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.
Lifecycle stage: Manufacturing - Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 8A, 8B, 9) - Environmental scenarios: 1 (ERC 1)

Qualitative Risk Assessment – PROC9: Transfer of chemicals into small containers (dedicated filling line)

Process category: PROC 9 Transfer of chemicals into small containers (dedicated filling line) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity for more than 240 min/day.) 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

2.0.1 Contributing Scenario controlling environmental exposure for ERC 2 – Formulation of prepar. (ERC 1)

Sector of Use: Not Applicable. Process Category: **PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.**
Environmental release category: ERC2 - Formulation of preparations

Annual site tonnage

5000 Ton/year. 1.67E4 kg/day.

Frequency and duration of use

Continuous, 300 days / year. Biodegradable product with reserve.

Environmental factors not influenced by risk management

- Local freshwater dilution factor 10
- Local marine water dilution factor 100
- Release fraction to air from process 0.005 %
- Release fraction to wastewater from process 0.005 %
- Release fraction to soil from process 0.010 %
- Fraction tonnage to region 100 %
- Fraction used at main source 100 %
- STP yes (municipal)
- River flow rate 18000 m3/day
- Municipal sewage treatment plant discharge 2000000 L/day

SpERC OP_2.2 (User-defined spERC (compounding, liquid curing agents) in accordance with the paper: "OECD SERIES ON EMISSION SCENARIO DOCUMENTS Number 3 EMISSION SCENARIO DOCUMENT ON PLASTIC ADDITIVES(ENV/JM/MONO(2004)8/REV1)".)

Other given operational conditions that influence environmental exposure

Residual waste sludge and washing solutions are disposed of by incineration. The substance is highly reactive. The substance decomposes forming inert organic molecules such as alcohols, ketones and hydrocarbons.

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

The release of the substance in air and in the ground is practically excluded. Production takes place in a closed system with the relative abatement systems except for the packaging phase (Bagging).

Technical conditions and measures at the site to reduce or limit discharges, air emissions and releases to soil

Install local ventilation systems (99% removal efficiency). In case of necessity to provide biological treatment of waste water with Off-Gas technology (Adsorpion unit), use catalytic purification systems off-gas clearing system at the production site level (emission removal efficiency 99.85%).

Organizational measures to prevent/limit release from site

Properly trained staff. Periodically monitor waste and solid waste discharges, if any. Avoid penetration into the subsoil. Do not allow the material to contaminate the water / groundwater. Do not allow product to enter the drains. In the case of pollution of rivers, lakes or sewers, inform the competent authorities.

Conditions and measures related to municipal sewage treatment plant

2000 m^3/days.

Conditions and measures related to external treatment of waste for disposal.

Dispose of waste and containers in cooperation with the relevant waste disposal authorities and in accordance with disposal regulations.

Conditions and measures related to external recovery of waste

None in particular.

3.0.0 Exposure estimation
EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a.
3.0.1 Exposure estimation – ERC2 – (EUSES v 2.1.1)

Protection target	PEC	PNEC	RCR = PEC/ PNEC	MSafe kg/d
Air (mg/m^3)	-----	-----	-----	-----
Fresh water (mg/l)	0.00517 mg/L	0.0056 mg/L	0.923129	1.81E4
Fresh water sediment (mg/kg/wwt)	0.080869 mg/kgdwt	0.0876 mg/kgdwt	0.923157	1.81E4
Marine water (mg/l)	0.000517 mg/L	0.00056 mg/L	0.923117	1.81E4
Marine water sediment (mg/kg/wwt)	0.008087 mg/kgdwt	0.00876 mg/kgdwt	0.923145	1.81E4
Soil 30 days mg/Kg/wwt	0.013657 mg/kgdwt	0.0142 mg/kgdwt	0.961756	1.73E4
WWTP (mg/l)	0.051695 mg/L	1.2 mg/L	0.043079	3.87E5
Acqua – Rilascio intermittente	-----	-----	-----	-----
Secondary Poisoning	-----	-----	-----	-----

3.0.2 Exposure estimation Workers – Industrial

3.0.1 Contributing Scenario (2) controlling industrial worker exposure for PROC 1

Combined total exposure (Inhalation and Dermal)	Evaluation carried out with PPE previously described.		
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.006857 mg/kgbw/day	0.006857 mg/kgbw/day	0.006857 mg/kgbw/day

inhalation, long-term syst.	0.069239 mg/m^3	5.288 mg/m^3	0.013094
Combined routes	0.016748 mg/kgbw/day	-	0.015379
3.0.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.274286 mg/kgbw/day	3 mg/kgbw/day	0.091429
inhalation, long-term syst.	0.692385 mg/m^3	5.288 mg/m^3	0.130935
Combined routes	0.373198 mg/kgbw/day	-	0.222364
3.0.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 3			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.137143 mg/kgbw/day	3 mg/kgbw/day	0.045714
inhalation, long-term syst.	2.077 mg/m^3	5.288 mg/m^3	0.392806
Combined routes	0.433879 mg/kgbw/day	-	0.43852
3.0.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 4			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.932995 mg/kgbw/day	-	0.555909
3.0.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 5			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.619 mg/kgbw/day	-	0.784481
3.0.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 8a			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.428571 mg/kgbw/day	3 mg/kgbw/day	0.142857
inhalation, long-term syst.	4.327 mg/m^3	5.288 mg/m^3	0.818345
Combined routes	1.047 mg/kgbw/day	-	0.961202
3.0.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 8b			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.619 mg/kgbw/day	-	0.784481
3.0.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 9			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term	1.731 mg/m^3	5.288 mg/m^3	0.327338

syst.			
Combined routes	0.932995 mg/kgbw/day	-	0.555909

Tier 1 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
9. 2 Formulation of preparations	0.069239[3]	0.034286[3] mg/kg/day	0.013094	0.011429	0.024522
10. 2 Formulation of preparations	0.692385[3]	1.371[3] mg/kg/day	0.130935	0.457143	0.588078
11. 2 Formulation of preparations	2.077[3]	0.685714[3] mg/kg/day	0.392806	0.228571	0.621377
12. 2 Formulation of preparations	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940
13. 2 Formulation of preparations	3.462[3]	13.714[3] mg/kg/day	0.654676	4.571	5.226
14. 2 Formulation of preparations	6.924[3]	13.714[3] mg/kg/day	1.309	4.571	5.881
15. 2 Formulation of preparations	1.731[3]	13.714[3] mg/kg/day	0.327338	4.571	4.899
16. 2 Formulation of preparations	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic 4 Longterm local 5 Shortterm systemic 6 Shortterm local

Tier 2 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
9. 2 Formulation of preparations	0.069239[3]	0.006857[3] mg/kg/day	0.013094	0.002286	0.015379
10. 2 Formulation of preparations	0.692385[3]	0.274286[3] mg/kg/day	0.130935	0.091429	0.222364
11. 2 Formulation of preparations	2.077[3]	0.137143[3] mg/kg/day	0.392806	0.045714	0.43852
12. 2 Formulation of preparations	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.228571	0.555909
13. 2 Formulation of preparations	1.731[3]	1.371[3] mg/kg/day	0.327338	0.457143	0.784481
14. 2 Formulation of preparations	4.327[3]	0.428571[3] mg/kg/day	0.818345	0.142857	0.961202
15. 2 Formulation of preparations	1.731[3]	1.371[3] mg/kg/day	0.327338	0.457143	0.784481
16. 2 Formulation of preparations	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.228571	0.555909

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic. 4 Longterm local. 5 Shortterm systemic 6 Shortterm local

Tier 2 Environmental Risk Assessments

Scenario name	RCR in STP	RCR for local freshwater	RCR for local freshwater sediment	RCR for local terrestrial environment	RCR for local marine water	RCR for local marine sediments	RCR fo humans via the environment
2. 2 Formulation of preparations	0.043079	0.923129	0.923157	0.961756	0.923117	0.923145	-

4.0.0 Guidance to check compliance with the Exposure Scenario

The predicted exposure does not exceed the DNEL / DMELs values and PEC / PNEC values if the risk management measures/ operational conditions are applied as described in Section 2. The available data on the risks do not allow to derive a DNEL for dermal irritant effects. The risk management measures are based on qualitative risk characterization for Dermal. If measures are taken to risk management / operating conditions different from those described above, users should ensure that those practices are at least an equivalent level. Unless otherwise stated, for the evaluation of the exposures on the job site was used as ECETOC TRA tool for the assessment of exposure to the environment has been used the tool EUSES.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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html - http//www.advancedreachtool.com - http//www.esig.org) [DSU4].

1. ES 3: Brief title of the exposure scenario:
Scenario 3: Industrial use of reactive processing aids
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
1.1. Title sectionEnvironmental release categories: CES 03: Industrial use of reactive processing aids. - ERC6b

Workers

1.2.0 Conditions of use that affect exposure

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters. An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure. The following scenarios contribute to the scenario Industrial use of reactive processing aid

1.2.1 Exposure Control Scenario 3: Industrial use of reactive processing aids. Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable. Lifecycle stage: Industrial use of reactive processing aids. - Worker scenarios: 1 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC 6b) PROC1 Use in closed process, no likelihood of exposure

Process category: PROC 1 Use in closed process, no likelihood of exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No **General:** Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max > 4 hours/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min. Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.3.0 Conditions of use that affect exposure

1.3.1 Exposure Control Scenario 3: Industrial use of reactive processing aids

Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.

Lifecycle stage: Industrial use of chemicals for polymer processing - Worker scenarios: 4 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC 2 Use in closed, continuous process with occasional controlled exposure

Process category: PROC 2 Use in closed, continuous process with occasional controlled exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No **General:** Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max > 4 hours/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.) Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.4.0 Conditions of use that affect exposure

1.4.1 Exposure Control Scenario 3: Industrial use of reactive processing aids.
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 3 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC3: Use in closed batch process (synthesis or formulation)

Process category: PROC 3 Use in closed batch process (synthesis or formulation) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No **General:** Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max > 4 hours/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.5.0 Conditions of use that affect exposure

1.5.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 4 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Process category: PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.6.0 Conditions of use that affect exposure

1.6.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 5 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC5: Mixing or blending in batch processes (multistage and/or significant contact)

Process category: PROC 5 Mixing or blending in batch processes (multistage and/or significant contact) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: no. Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately. Respiratory protection: Not foreseen.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.7.0 Conditions of use that affect exposure

1.7.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 6 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC7: Industrial spraying

Process category: PROC 7 Industrial spraying Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: 1 - 4 hours Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No
General: Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (1500 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 95 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: 90 % (justification: Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.8.0 Conditions of use that affect exposure

1.8.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Uso industriale di coadiuvanti - Worker scenarios: 7 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities.

Process category: PROC 8a Transfer of chemicals from/to vessels/large containers at non dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No
General: Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 300 min/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store

separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 95 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.) Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.9.0 Conditions of use that affect exposure
1.9.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC8b: Transfer of chemicals from/to vessels/ large containers at dedicated facilities.

Process category: PROC 8b Transfer of chemicals from/to vessels/large containers at dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: Nom Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max > 4 hours/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 95 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 90 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with 'basic' employee training.) Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.10.0 Conditions of use that affect exposure
1.10.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 9 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC9: Transfer of chemicals into small containers (dedicated filling line)

Process category: PROC 9 Transfer of chemicals into small containers (dedicated filling line) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.11.0 Conditions of use that affect exposure
1.11.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 10 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC10: Roller application or brushing

Process category: PROC 10 Roller application or brushing Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: 1 - 4 hours Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

Max 240 min/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.12.0 Conditions of use that affect exposure

1.12.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 11 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC13: Treatment of articles by dipping and pouring

Process category: PROC 13 Treatment of articles by dipping and pouring Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

300 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 300 min/day.) 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.13.0 Conditions of use that affect exposure

1.13.1 Exposure Control Scenario 3: Industrial use of reactive processing aids Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 12 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation.

Process category: PROC 14 Production of preparations or articles by tabletting, compression, extrusion, pelletisation Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No
General: Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day.) 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: <30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

2.0.1 Contributing Scenario (1) controlling environmental exposure for ERC 6B – Industrial use of reactive processing aids. – (ERC 6b)

Sector of Use: Not Applicable. Process Category: **PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14.** Environmental release category: ERC 6b Industrial use of reactive processing aids

Annual site tonnage

2500 Ton/year. 8,333.333 kg/day

Frequency and duration of use

Continuous, 300 days / year. Biodegradable product with reserve.

Environmental factors not influenced by risk management

- Local freshwater dilution factor 10
- Local marine water dilution factor 100
- Release fraction to air from process 0 %
- Release fraction to wastewater from process 0.010 %
- Release fraction to soil from process 0.025 %
- Fraction tonnage to region 100 %
- Fraction used at main source 100 %
- STP yes (municipal)
- River flow rate 18000 m3/day
- Municipal sewage treatment plant discharge 2000000 L/day

OP_6b.1 (User-defined spERC (raw materials' handling, liquid curing agents) in accordance with the paper: "OECD SERIES ON EMISSION SCENARIO DOCUMENTS Number 3 EMISSION SCENARIO DOCUMENT ON PLASTIC ADDITIVES(ENV/JM/MONO(2004)8/REV1)".)

Other given operational conditions that influence environmental exposure

Residual waste sludge and washing solutions are disposed of by incineration. The substance is highly reactive. The substance decomposes forming inert organic molecules such as alcohols, ketones and hydrocarbons.

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

The release of the substance in air and in the ground is practically excluded. Production takes place in a closed system with the relative abatement systems except for the packaging phase (Bagging).

Technical conditions and measures at the site to reduce or limit discharges, air emissions and releases to soil

Install local ventilation systems (99% removal efficiency). In case of necessity to provide biological treatment of waste water with Off-Gas technology (Adsorpion unit), use catalytic purification systems off-gas clearing system at the production site level (emission removal efficiency 99.85%).

Organizational measures to prevent/limit release from site

Properly trained staff. Periodically monitor waste and solid waste discharges, if any. Avoid penetration into the subsoil. Do not allow the material to contaminate the water / groundwater. Do not allow product to enter the drains. In the case of pollution of rivers, lakes or sewers, inform the competent authorities.

Conditions and measures related to municipal sewage treatment plant

2000 m^3/days.

Conditions and measures related to external treatment of waste for disposal.

Dispose of waste and containers in cooperation with the relevant waste disposal authorities and in accordance with disposal regulations.

Conditions and measures related to external recovery of waste

None in particular.

3.0.0 Exposure estimation
EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a.

3.0.1 Exposure estimation Environmental – Industrial use of reactive processing aids – ERC6b – (EUSES v 2.1.1)

Protection target	PEC	PNEC	RCR =	MSafe kg/d

			PEC/ PNEC	
Air (mg/m^3)	-----	-----	-----	-----
Fresh water (mg/l)	0.00517 mg/L	0.0056 mg/L	0.923129	9,027.269
Fresh water sediment (mg/kg/wwt)	0.080869 mg/kgdwt	0.0876 mg/kgdwt	0.923157	9,026.995
Marine water (mg/l)	0.000517 mg/L	0.00056 mg/L	0.923117	9,027.385
Marine water sediment (mg/kg/wwt)	0.008087 mg/kgdwt	0.00876 mg/kgdwt	0.923145	9,027.11
Soil 30 days mg/Kg/wwt	0.013622 mg/kgdwt	0.0142 mg/kgdwt	0.959303	8,686.861
WWTP (mg/l)	0.051695 mg/L	1.2 mg/L	0.043079	1.93E5
Acqua – Rilascio intermittente	-----	-----	-----	-----
Secondary Poisoning	-----	-----	-----	-----

3.0.2 Exposure estimation Workers – Industrial - ERC 6b Industrial use of reactive processing aids

3.0.1 Contributing Scenario (1) controlling industrial worker exposure for PROC 1

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.006857 mg/kgbw/day	3 mg/kgbw/day	0.002286
inhalation, long-term syst.	0.069239 mg/m^3	5.288 mg/ m^3	0.013094
Combined routes	0.016748 mg/kgbw/day	-	0.015379

3.0.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 2

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.274286 mg/kgbw/day	3 mg/kgbw/day	0.091429
inhalation, long-term syst.	0.692385 mg/m^3	5.288 mg/m^3	0.130935
Combined routes	0.373198 mg/kgbw/day	-	0.222364

3.0.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 3

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.137143 mg/kgbw/day	3 mg/kgbw/day	0.045714
inhalation, long-term syst.	2.077 mg/m^3	5.288 mg/m^3	0.392806
Combined routes	0.433879 mg/kgbw/day	-	0.43852

3.0.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 4

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.932995 mg/kgbw/day	-	0.555909

3.0.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 5

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338

Combined routes	1.619 mg/kgbw/day	-	0.784481
3.0.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 7			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.071 mg/kgbw/day	3 mg/kgbw/day	0.357143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.319 mg/kgbw/day	-	0.684481
3.0.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 8a			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.428571 mg/kgbw/day	3 mg/kgbw/day	0.142857
inhalation, long-term syst.	4.327 mg/m^3	5.288 mg/m^3	0.818345
Combined routes	1.047 mg/kgbw/day	-	0.961202
3.0.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 8b			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.619 mg/kgbw/day	-	0.784481
3.0.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 9			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.932995 mg/kgbw/day	-	0.555909
3.0.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 10			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	3.462 mg/m^3	5.288 mg/m^3	0.654676
Combined routes	1.18 mg/kgbw/day	-	0.883247
3.0.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 13			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.428571 mg/kgbw/day	3 mg/kgbw/day	0.142857
inhalation, long-term syst.	4.327 mg/m^3	5.288 mg/m^3	0.818345
Combined routes	1.047 mg/kgbw/day	-	0.961202
3.0.12 Contributing Scenario (13) controlling industrial worker exposure for PROC 14			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**

Dermal, long-term syst.	0.342857 mg/kgbw/day	3 mg/kgbw/day	0.114286
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.590138 mg/kgbw/day	-	0.441624

Tier 1 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
17. 3 Industrial use of reactive processing aids	0.069239[3]	0.034286[3] mg/kg/day	0.013094	0.011429	0.024522
18. 3 Industrial use of reactive processing aids	0.692385[3]	1.371[3] mg/kg/day	0.130935	0.457143	0.588078
19. 3 Industrial use of reactive processing aids	2.077[3]	0.685714[3] mg/kg/day	0.392806	0.228571	0.621377
20. 3 Industrial use of reactive processing aids	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940
21. 3 Industrial use of reactive processing aids	3.462[3]	13.714[3] mg/kg/day	0.654676	4.571	5.226
22. 3 Industrial use of reactive processing aids	20.772[3]	42.857[3] mg/kg/day	3.928	14.286	18.214
23. 3 Industrial use of reactive processing aids	6.924[3]	13.714v mg/kg/day	1.309	4.571	5.881
24. 3 Industrial use of reactive processing aids	1.731[3]	13.714[3] mg/kg/day	0.327338	4.571	4.899
25. 3 Industrial use of reactive processing aids	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940
26. 3 Industrial use of reactive processing aids	4.154[3]	27.429[3] mg/kg/day	0.785611	9.143	9.928
27. 3 Industrial use of reactive processing aids	6.924[3]	13.714[3] mg/kg/day	1.309	4.571	5.881
28. 3 Industrial use of reactive processing aids	3.462[3]	3.429[3] mg/kg/day	0.654676	1.143	1.798

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic 4 Longterm local 5 Shortterm systemic 6 Shortterm local

Tier 2 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
17. 3 Industrial use of reactive processing aids	0.069239[3]	0.006857[3] mg/kg/day	0.013094	0.002286	0.015379
18. 3 Industrial use of reactive processing aids	0.692385[3]	0.274286[3] mg/kg/day	0.130935	0.091429	0.222364
19. 3 Industrial use of reactive processing aids	2.077[3]	0.137143[3] mg/kg/day	0.392806	0.045714	0.43852
20. 3 Industrial use of reactive processing aids	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.228571	0.555909
21. 3 Industrial use of reactive processing aids	1.731[3]	1.371[3] mg/kg/day	0.327338	0.457143	0.784481
22. 3 Industrial use of reactive processing aids	1.731[3]	1.071[3] mg/kg/day	0.327338	0.357143	0.684481
23. 3 Industrial use of reactive processing aids	4.327[3]	0.428571[3] mg/kg/day	0.818345	0.142857	0.961202

24. 3 Industrial use of reactive processing aids	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.457143	0.784481
25. 3 Industrial use of reactive processing aids	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.228571	0.555909
26. 3 Industrial use of reactive processing aids	3.462[3]	0.685714[3] mg/kg/day	0.654676	0.228571	0.883247
27. 3 Industrial use of reactive processing aids	4.327[3]	0.428571[3]mg/kg/day	0.818345	0.142857	0.961202
28. 3 Industrial use of reactive processing aids	1.731[3]	0.342857[3] mg/kg/day	0.327338	0.114286	0.441624

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic. 4 Longterm local. 5 Shortterm systemic 6 Shortterm local

Tier 2 Environmental Risk Assessments

Scenario name	RCR in STP	RCR for local freshwater	RCR for local freshwater sediment	RCR for local terrestrial environment	RCR for local marine water	RCR for local marine sediments	RCR fo humans via the environment
3. 3 Industrial use of reactive processing aids	0.043079	0.923129	0.923157	0.959303	0.923117	0.923145	-

4.0.0 Guidance to check compliance with the Exposure Scenario

The predicted exposure does not exceed the DNEL / DMELs values and PEC / PNEC values if the risk management measures/ operational conditions are applied as described in Section 2. The available data on the risks do not allow to derive a DNEL for dermal irritant effects. The risk management measures are based on qualitative risk characterization for Dermal. If measures are taken to risk management / operating conditions different from those described above, users should ensure that those practices are at least an equivalent level. Unless otherwise stated, for the evaluation of the exposures on the job site was used as ECETOC TRA tool for the assessment of exposure to the environment has been used the tool EUSES.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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html - http//www.advancedreachtool.com - http//www.esig.org) [DSU4].

1. ES 3: Brief title of the exposure scenario:
Scenario 4: Industrial use of chemicals for polymer processing
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
1.1. Title section

Environmental release categories: CES 04: Industrial use of chemicals for polymer processing ERC6d

Workers

1.2.0 Conditions of use that affect exposure

1.2.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing - Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Industrial use of chemicals for polymer processing - Worker scenarios: 1 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 4 (ERC 6d). PROC1 Use in closed process, no likelihood of exposure

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters. An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure. The following scenarios contribute to the scenario Industrial use of chemicals for polymer processing. Process category: PROC 1 Use in closed process, no likelihood of exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. **Eyes Use suitable eye protection.**

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

> 4 h/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.) Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.3.0 Conditions of use that affect exposure

1.3.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Industrial use of chemicals for polymer processing - Worker scenarios: 2 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 4 (ERC 6d). Qualitative Risk Assessment – PROC 2 Use in closed, continuous process with occasional controlled exposure

Process category: PROC 2 Use in closed, continuous process with occasional controlled exposure Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

> 4 h/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: Gloves with adequate chemical resistance complying with EN374 and with specific training activities. Protective gloves 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.) Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.4.0 Conditions of use that affect exposure

1.4.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing
Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 3 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 4 (ERC6d). Qualitative Risk Assessment – PROC3: Use in closed batch process (synthesis or formulation)

Process category: PROC 3 Use in closed batch process (synthesis or formulation) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

> 4 h/day, duration of activity has been considered linearly - 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (240 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.5.0 Conditions of use that affect exposure

1.5.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Uso industriale di coadiuvanti - Worker scenarios: 4 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 4 (ERC6d). Qualitative Risk Assessment – PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Process category: PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in

preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.6.0 Conditions of use that affect exposure

1.6.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 5 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 4 (ERC6b). Qualitative Risk Assessment – PROC5: Mixing or blending in batch processes (multistage and/or significant contact).

Process category: PROC 5 Mixing or blending in batch processes (multistage and/or significant contact) Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. General: Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.7.0 Conditions of use that affect exposure

1.7.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 6 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 4 (ERC6b). Qualitative Risk Assessment – PROC7: Industrial spraying

Process category: PROC 7 Industrial spraying Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: 1 - 4 hours Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No **General**: Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (1,500 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 95 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.) Respiratory protection: Yes. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.8.0 Conditions of use that affect exposure

1.8.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 7 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC8a: Transfer of chemicals from/to vessels/ large containers at non dedicated facilities.

Process category: PROC 8a Transfer of chemicals from/to vessels/large containers at non dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

300 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 300 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.9.0 Conditions of use that affect exposure
1.9.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 8 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC8b: Transfer of chemicals from/to vessels/ large containers at dedicated facilities.

Process category: PROC 8b Transfer of chemicals from/to vessels/large containers at dedicated facilities Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

300 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 300 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 95 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 90 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with 'basic' employee training.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.10.0 Conditions of use that affect exposure
1.10.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 9 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC9: Transfer of chemicals into small containers (dedicated filling line)

Process category: PROC 9 Transfer of chemicals into small containers (dedicated filling line) Type of setting: Industrial Calculation

model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.11.0 Conditions of use that affect exposure
1.11.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing. Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.
Lifecycle stage: Worker scenarios: 10 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC10: Roller application or brushing

Process category: PROC 10 Roller application or brushing Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: 1 - 4 hours Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (960 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene

measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.12.0 Conditions of use that affect exposure

1.12.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.

Lifecycle stage: Worker scenarios: 11 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC13: Treatment of articles by dipping and pouring

Process category: PROC 13 Treatment of articles by dipping and pouring Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

300 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 300 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 95 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min in combination with specific activity training and intensive management supervision.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

1.13.0 Conditions of use that affect exposure

1.13.1 Exposure Control Scenario 4: Industrial use of chemicals for polymer processing Sector of Use: SU: SU3, SU8, SU9. Process Category: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14. PC: Not Applicable.

Lifecycle stage: Worker scenarios: 12 (PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14) - Environmental scenarios: 3 (ERC6b). Qualitative Risk Assessment – PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation.

Process category: PROC 14 Production of preparations or articles by tabletting, compression, extrusion, pelletisation Type of setting: Industrial Calculation model: ECETOC TRA Exposure type inhalation: Long-term systemic Exposure type dermal: Long-term systemic Solid: No Duration of activity [h/day]: > 4 hours (default) Use of ventilation: Indoors with LEV Use of respiratory protection: No Substance in preparation: No Dermal PPE: No Consider LEV for dermal exposure: No. **General:** Assumes a good basic standard of occupational hygiene is implemented. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Eyes: Use suitable eye protection.

Product characteristics

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness low Packaging: max 30 kg.

Amount Used, frequency, duration of the Exposure.

240 min/day, duration of activity has been considered linearly (justification: Do not carry out activity > than 240 min/day. 5 days / week

Human factors not influenced by risk management

Area of potential contact with the skin under use conditions: hands and face (480 cm^2). Body weight: 70 kg (worker).

Other given operational conditions affecting workers exposure

Location: indoors. Domain: industrial

Organizational measures to avoid / limit spills, dispersion and exposure.

Keep the containers tightly closed. Keep containers away from heat and sources of ignition (storage temperature: < 30 ° C). Avoid contact with accelerators, acids and strong bases, salts of heavy metals, reducing substances. Avoid impurities (eg dust, rust, ash). Store separately from other incompatible and / or dangerous substances. Properly trained staff.

Technical conditions and measures to control dispersion and exposure

Local exhaust ventilation yes (inhalation 90 %)

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

Oral Protection: Apply good industrial processing and hygiene practices. The exposure via Oral is not considered to be relevant for workers. Skin Protection: 80 %, burst-time: >4 hours (default) (justification: Wear chemically resistant gloves according to Standard EN 374 with a breakthrough time > 480 min.). Respiratory protection: No. Wear suitable respiratory protection (conforming to EN140:2001 with Type A filter or better) providing a minimum efficiency of (%): 90). Avoid direct skin contact with the product. Identify potential areas for indirect contact with the skin. Eye protection: Eye protection (according to EN 166): tightly fitting goggles. For further specifications, see Section 8 of the SDS. Hygiene measures: Remove and wash contaminated clothing before re-use. Wash hands before breaks and immediately after handl ing the product. Keep away from food, drink and animal feed. Wash off any contamination of the skin immediately.

Other conditions that influence worker exposure

Segregation: No. Separation: No.

2.0.1 Environmental Scenario – Industrial use of reactive processing aids. – (ERC 6b)

Sector of Use: Not Applicable. Process Category: **PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9.**
Environmental release category: ERC1 - Produzione di sostanze chimiche.

Annual site tonnage

2500 Ton/year. 8,333.333 kg/day

Frequency and duration of use

Continuous, 300 days / year. Biodegradable product with reserve.

Environmental factors not influenced by risk management

- Local freshwater dilution factor 10
- Local marine water dilution factor 100
- Release fraction to air from process 0 %
- Release fraction to wastewater from process 0.010 %
- Release fraction to soil from process 0.025 %
- Fraction tonnage to region 100 %
- Fraction used at main source 100 %
- STP yes (municipal)
- River flow rate 18000 m3/day
- Municipal sewage treatment plant discharge 2000000 L/day
-

OP_6b.1 (User-defined spERC (raw materials' handling, liquid curing agents) in accordance with the paper: "OECD SERIES ON EMISSION SCENARIO DOCUMENTS Number 3 EMISSION SCENARIO DOCUMENT ON PLASTIC ADDITIVES(ENV/JM/MONO(2004)8/REV1)".)

Other given operational conditions that influence environmental exposure

Residual waste sludge and washing solutions are disposed of by incineration. The substance is highly reactive. The substance decomposes forming inert organic molecules such as alcohols, ketones and hydrocarbons.

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

The release of the substance in air and in the ground is practically excluded. Production takes place in a closed system with the relative abatement systems except for the packaging phase (Bagging).

Technical conditions and measures at the site to reduce or limit discharges, air emissions and releases to soil

Install local ventilation systems (99% removal efficiency). In case of necessity to provide biological treatment of waste water with Off-Gas technology (Adsorpion unit), use catalytic purification systems off-gas clearing system at the production site level (emission removal efficiency 99.85%).

Organizational measures to prevent/limit release from site

Properly trained staff. Periodically monitor waste and solid waste discharges, if any. Avoid penetration into the subsoil. Do not allow the material to contaminate the water / groundwater. Do not allow product to enter the drains. In the case of pollution of rivers, lakes or sewers, inform the competent authorities.

Conditions and measures related to municipal sewage treatment plant

2000 m^3/days.

Conditions and measures related to external treatment of waste for disposal.

Dispose of waste and containers in cooperation with the relevant waste disposal authorities and in accordance with disposal regulations.

Conditions and measures related to external recovery of waste

None in particular.

Frequency and duration of use

3.0.0 Exposure estimation
EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a.

3.0.1 Exposure estimation Environmental – Industrial use of reactive processing aids – ERC6b – (EUSES v 2.1.1)

Protection target	PEC	PNEC	RCR =	MSafe kg/d

			PEC/ PNEC	
Air (mg/m^3)	-----	-----	-----	-----
Fresh water (mg/l)	0.00517 mg/L	0.0056 mg/L	0.923129	9,027.269
Fresh water sediment (mg/kg/wwt)	0.080869 mg/kgdwt	0.0876 mg/kgdwt	0.923157	9,026.995
Marine water (mg/l)	0.000517 mg/L	0.00056 mg/L	0.923117	9,027.385
Marine water sediment (mg/kg/wwt)	0.008087 mg/kgdwt	0.00876 mg/kgdwt	0.923145	9,027.11
Soil 30 days mg/Kg/wwt	0.013622 mg/kgdwt	0.0142 mg/kgdwt	0.959303	8,686.861
WWTP (mg/l)	0.051695 mg/L	1.2 mg/L	0.043079	1.93E5
Acqua – Rilascio intermittente	-----	-----	-----	-----
Secondary Poisoning	-----	-----	-----	-----

3.0.2 Exposure estimation Workers

3.0.1 Contributing Scenario (1) controlling industrial worker exposure for PROC 1

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.006857 mg/kgbw/day	3 mg/kgbw/day	0.002286
inhalation, long-term syst.	0.069239 mg/m^3	5.288 mg/m^3	0.013094
Combined routes	0.016748 mg/kgbw/day	-	0.015379

3.0.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 2

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.274286 mg/kgbw/day	3 mg/kgbw/day	0.091429
inhalation, long-term syst.	0.692385 mg/m^3	5.288 mg/m^3	0.130935
Combined routes	0.373198 mg/kgbw/day	-	0.222364

3.0.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 3

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.137143 mg/kgbw/day	3 mg/kgbw/day	0.045714
inhalation, long-term syst.	2.077 mg/m^3	5.288 mg/m^3	0.392806
Combined routes	0.433879 mg/kgbw/day	-	0.43852

3.0.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 4

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.932995 mg/kgbw/day	-	0.555909

3.0.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 5

Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.619 mg/kgbw/day	-	0.784481

3.0.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 7			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.071 mg/kgbw/day	3 mg/kgbw/day	0.357143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.319 mg/kgbw/day	-	0.684481
3.0.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 8a			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.428571 mg/kgbw/day	3 mg/kgbw/day	0.142857
inhalation, long-term syst.	4.327 mg/m^3	5.288 mg/m^3	0.818345
Combined routes	1.047 mg/kgbw/day	-	0.961202
3.0.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 8b			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	1.371 mg/kgbw/day	3 mg/kgbw/day	0.457143
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	1.619 mg/kgbw/day	-	0.784481
3.0.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 9			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338
Combined routes	0.932995 mg/kgbw/day	-	0.555909
3.0.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 10			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.685714 mg/kgbw/day	3 mg/kgbw/day	0.228571
inhalation, long-term syst.	3.462 mg/m^3	5.288 mg/m^3	0.654676
Combined routes	1.18 mg/kgbw/day	-	0.883247
3.0.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 13			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.428571 mg/kgbw/day	3 mg/kgbw/day	0.142857
inhalation, long-term syst.	4.327 mg/m^3	5.288 mg/m^3	0.818345
Combined routes	1.047 mg/kgbw/day	-	0.961202
3.0.12 Contributing Scenario (13) controlling industrial worker exposure for PROC 14			
Combined total exposure (Inhalation and Dermal)		Evaluation carried out with PPE previously described.	
Route	**Exposure concentration (EC)**	**DNEL**	**Risk characterisation ratio = EC/DNEL**
Dermal, long-term syst.	0.342857 mg/kgbw/day	3 mg/kgbw/day	0.114286
inhalation, long-term syst.	1.731 mg/m^3	5.288 mg/m^3	0.327338

Combined routes	0.590138 mg/kgbw/day	-	0.441624

Tier 2 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
29. 4 Industrial use of chemicals for polymer processing	0.069239[3]	0.034286[3] mg/kg/day	0.013094	0.011429	0.024522
30. 4 Industrial use of chemicals for polymer processing	0.692385[3]	1.371[3] mg/kg/day	0.130935	0.457143	0.588078
31. 4 Industrial use of chemicals for polymer processing	2.077[3]	0.685714[3] mg/kg/day	0.392806	0.228571	0.621377
32. 4 Industrial use of chemicals for polymer processing	3.462[3]	6.857[3] mg/kg/day	0.654676	2.286	2.940
33. 4 Industrial use of chemicals for polymer processing	3.462[3]	13.714[3] mg/kg/day	0.654676	4.571	5.226
34. 4 Industrial use of chemicals for polymer processing	20.772[3]	42.857[3] mg/kg/day	3.928	14.286	18.214
35. 4 Industrial use of chemicals for polymer processing	6.924[3]	13.714[3] mg/kg/day	1.309	4.571	5.881
36. 4 Industrial use of chemicals for polymer processing	1.731[3]	13.714[3] mg/kg/day	0.327338	4.571	4.899
37. 4 Industrial use of chemicals for polymer processing	2.077[3]	6.857[3] mg/kg/day	0.392806	2.286	2.679
38. 4 Industrial use of chemicals for polymer processing	4.154[3]	27.429[3] mg/kg/day	0.785611	9.143	9.928
39. 4 Industrial use of chemicals for polymer processing	6.924[3]	13.714[3] mg/kg/day	1.309	4.571	5.881
40. 4 Industrial use of chemicals for polymer processing	2.077[3]	3.429[3] mg/kg/day	0.392806	1.143	1.536

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic 4 Longterm local 5 Shortterm systemic 6 Shortterm local

Tier 2 Exposure Estimations / Risk Assessments Workers

Scenario name	Inhalative Exposure Estimate	Dermal Exposure Estimate	Risk Characterization Ratio - Inhalation	Risk Characterization Ratio - Dermal	Risk Characterization Ratio - Total
17. 3 Industrial use of reactive processing aids	0.069239[3]	0.006857[3] mg/kg/day	0.013094	0.002286	0.015379
18. 3 Industrial use of reactive processing aids	0.692385[3]	0.274286[3] mg/kg/day	0.130935	0.091429	0.222364
19. 3 Industrial use of reactive processing aids	2.077[3]	0.137143[3] mg/kg/day	0.392806	0.045714	0.43852
20. 3 Industrial use of	1.731[3]	0.685714[3]	0.327338	0.228571	0.555909

reactive processing aids		mg/kg/day			
21. 3 Industrial use of reactive processing aids	1.731[3]	1.371[3] mg/kg/day	0.327338	0.457143	0.784481
22. 3 Industrial use of reactive processing aids	1.731[3]	1.071[3] mg/kg/day	0.327338	0.357143	0.684481
23. 3 Industrial use of reactive processing aids	4.327[3]	0.428571[3] mg/kg/day	0.818345	0.142857	0.961202
24. 3 Industrial use of reactive processing aids	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.457143	0.784481
25. 3 Industrial use of reactive processing aids	1.731[3]	0.685714[3] mg/kg/day	0.327338	0.228571	0.555909
26. 3 Industrial use of reactive processing aids	3.462[3]	0.685714[3] mg/kg/day	0.654676	0.228571	0.883247
27. 3 Industrial use of reactive processing aids	4.327[3]	0.428571[3]mg/kg/day	0.818345	0.142857	0.961202
28. 3 Industrial use of reactive processing aids	1.731[3]	0.342857[3] mg/kg/day	0.327338	0.114286	0.441624

1 For the combination of PROC 1 and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (0.01 ppm). 2 For this combination of selected PROC and the applied category of volatility (excluding aerosols and mists), exposure is considered to be negligible (< 0.1 ppm). 3 Longterm systemic. 4 Longterm local. 5 Shortterm systemic 6 Shortterm local

Tier 2 Environmental Risk Assessments

Scenario name	RCR in STP	RCR for local freshwater	RCR for local freshwater sediment	RCR for local terrestrial environment	RCR for local marine water	RCR for local marine sediments	RCR fo humans via the environment
4. 4 Industrial use of chemicals for polymer processing	0.043079	0.923129	0.923157	0.959303	0.923117	0.923145	-

4.0.0 Guidance to check compliance with the Exposure Scenario

The predicted exposure does not exceed the DNEL / DMELs values and PEC / PNEC values if the risk management measures/ operational conditions are applied as described in Section 2. The available data on the risks do not allow to derive a DNEL for dermal irritant effects. The risk management measures are based on qualitative risk characterization for Dermal. If measures are taken to risk management / operating conditions different from those described above, users should ensure that those practices are at least an equivalent level. Unless otherwise stated, for the evaluation of the exposures on the job site was used as ECETOC TRA tool for the assessment of exposure to the environment has been used the tool EUSES.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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html - http//www.advancedreachtool.com - http//www.esig.org) [DSU4].

5.0.0 Legend for Exposure Scenarios

ACH: Air Change Hours. Air exchange every hour. PPE: Personal protective equipment. Individual protection device. RPE: Respiratory protective equipment (RPE). Respiratory Protection Device. LEV: Local exhaust ventilation systems. Localization system. DNEL: Derived. No-Effect Levels. Levels derived without effect. DMEL: Derived. Minimum-Effect Levels derived levels with minimal effects. PEC: Predicted environmental concentration. Environmental Exposure expected. PNEC: Predicted non-effetive environmental concentration. Environmental concentration without effects. TIER1: Exposure assessment performed using a model (Generic Exposure Databases) compared to the AOEL (acceptable operator exposure level - value considered to be acceptable to the operator). TIER2: Evaluation that calibrates the absorbed dose more and is generally carried out when the value of AOEL is exceeded in TIER1. AOEL, acceptable occupational exposure limit Near Field: <1m from the Emission Source Far Field: Remote Operator> 1m from the Emission Source ECETOC TRA: ECETOC Targeted Risk Assessment (TRA) - Software for the exposure evaluation Workers ART: Advanced Reach Tool - Software for the exposure assessment Workers EUSES: European Union System for the Evaluation of Substances - Software for the Environmental Exposure Assessment EN374: The EN374-3 standard concerns the determination of the resistance of materials with which gloves are made to permeability with respect to chemicals that are not gases and which are potentially dangerous in the event of continuous contact.

Unless otherwise specified, the following are used: EUSES v 2.1.1 European Union System for the Evaluation of Substances for the Environmental Exposure estimation and Ecetoc TRA (2009) Tool for the Exposure estimation of workers. Industrial and / or Professional.

5.0.1 Annex II - Glossary for Exposure Scenarios.

AC: Article Category, element of the Use Descriptor System (UDS) characterising the type of article in which a substance is contained. **ACH:** Air Change Hours. **AF:** Assessment factor. ART Advanced REACH Tool: is a Tier 2 tool, making use of mechanistically modelled estimates of exposure and any relevant measurements of exposure. The tool provides estimates of the whole distribution of exposure vAirbility and uncertainty, allowing the user to produce a variety of realistic and reasonable worst-case exposure estimates, dependent upon the requirements of the particular risk assessment. The model takes into account several operational conditions and risk management measures throughout the whole exposure pathway from source to worker. Amongst its strengths, it shall be noted that ART provides the choice of several percentiles of the resulting exposure distribution, provides an indication of the uncertainty of the mechanistic model result and there is the possibility to estimate exposure during a number of consecutive activities. ART is a web-tool that is free to use following registration. Registration can be easily done via the website http://www.advancedreachtool.com.
AOEL, acceptable occupational exposure limit. **Assigned protection factor:** Means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=standards. **Brief description of uses:** Description of identified uses in the registration dossier (see REACH Annex VI, point 3.5).
http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_ r20_en.pdf?vers=20_08_08. **Conditions of Use:** Conditions of Use include the operational conditions (OC) and risk management measures (RMM) as described in an ES. **Contributing ES:** Briefly, in the exposure scenario, the conditions driving exposure to humans and to the environment are to be consistent. OC and RMM relative to occupational exposure are usually task- or workplace related. Releases to the environment are, however, mostly assessed at site level or at the level of life cycle stages. Consequently, one set of environmental OC and RMM related to a representative site for a use can be connected to several sets of OC/RMM for the different activities of workers carried out at this site. One ES can thus include different contributing scenarios: one contributing scenario related to the environment and one or more contributing scenarios related to human exposure. **CSA Chemical Safety Assessment.** Process aimed at determining the risk posed by a substance and, as part of the exposure assessment, develop exposure scenarios including risk management measures to control the risks. **CSR Chemical Safety Report.** It documents the chemical safety assessment (CSA) for a substance on its own, in a preparation or in an article or a group of substances. In other words the chemical safety report (CSR) is a document, which details the process and the results of a chemical safety assessment (CSA). Annex I of the REACH Regulation contains general provisions for performing CSAs and preparing CSRs. **Dermal route** Dermal exposure is usually short-term from splashing or spilling the chemical during use or from contact with treated surfaces. It can result in damage to the skin or absorption through the skin into the body. Dermal exposure can also be chronic if it occurs
Repeatedly over a long period of time. **Determinants of emissions/exposure:** Factors determining the exposure and or release when a sub-stance is manufactured or used (including the subsequent life cycle stages: service life and waste disposal). These factors include the characteristics of the substance, the operational conditions and risk management measures. **DF** Dilution Factors, by default = 10 for freshwater, 100 for marine water. **DMEL** Derived minimum effect level. **DNEL** Derived no effect level. **DU** Downstream User: who uses a substance, either on its own or in a preparation, in the course of his industrial or professional activities. A distributor or a consumer is not a downstream user. **DU-CSA** Downstream user chemical safety assessment. **EASE** Estimation and assessment of substance exposure, modelling tool to estimate exposure when measured data are not available. It has been demonstrated that for several metals, EASE produces produce significant overestimates (compared to measured data). EASE has been used in the previous Existing Substances Regulation**. ECETOC-TRA** Tier 1 software tool' that can be used to generate exposure/emissions estimates in the absence of (measured) data. It is provided in an integrated version which allows the user to perform worker, consumer or environmental assessment via one interface. It can be downloaded free of charge, after completing the download request form from http://www.ecetoc.org/tra. **Emission potential** For operations conducted with solid substances at ambient temperature the emission potential is considerably dependent upon the dustiness of that substance, therefore the exposure assessment is based on the emission potential associated with the conducted process. Thus, any PROC selection should be based on the main driver of the emission potential of a process. **ERC** Environmental release categories [ERC] label the characteristics of a use based on several aspects relevant from the environmental perspective. **ES** Exposure scenario: Set of conditions, including operational conditions and risk management measures, that describe how the substance is manufactured or used safely during its life-cycle and how the manufacturer or importer controls, or recommends downstream users to control, exposures of humans and the environment. **eSDS** Extended Safety Data Sheet **EUSES** European System for the Evaluation of Substances. **Exposure assessment** Exposure assessment aims to make a quantitative or qualitative estimate of the dose / concentration of the substance to which humans and the environment are or may be exposed. Exposure assessment under REACH consists of two steps: 1) Development of Exposure Scenarios and 2) Exposure Estimation, which have to be iterated until it can be concluded that the resulting exposure scenarios would ensure adequate control of risks upon implementation. **Exposure estimation** Quantification of exposure related to the operational conditions and risk management measures as described in an exposure scenario. Exposure scenario building and the related exposure estimate together build the exposure assessment. GES Generic Exposure Scenarios are ES for the typical conditions of use(s) of a certain type of substance (e.g. solvents, pigments, resins, detergents) within a certain sector industry (area of use), suitable to control risks for substances with a certain generic hazard profile (e.g. low toxicity , low

volatility). Such GES aims to cover the whole life cycle of the type of substance. **Identified use** Means a use of a substance on its own or in a preparation, or a use of a preparation, that is intended by an actor in the supply chain, including his own use, or that is made known to him in writing by an immediate downstream user. Inhalation route Route of exposure. One is exposed to e.g. gases, fumes, dust by the act of inhaling, breathing. Inhalation exposure can be acute, for example breathing a chemical during short-term use, or chronic, for example longer-term inhalation of chemicals at the workplace. **LC50 / LD50** Median lethal concentration. The concentration causing 50 % lethality /Median lethal dose. The dose causing 50 % lethality. **LEV** Local exhaust ventilation Level of Containment Determinant related to exposure of humans and environment and for example in MEASE the processes for which the exposure potential is driven by the level of
containment rather than process itself is defined by 4 categories. **Localised controls** Risk management measures represent implemented (locally installed) devices or any personal protective equipment to reduce workers' exposure. In MEASE, there are several different localized controls with corresponding efficiencies as reported by Fransman et al.(2008). **NAEC/ NAEL /NOAEL/ NOEL** No adverse effect concentration /No adverse effect level /No observed adverse effect level/ No observed effect level. **OC** Operational conditions: those include e.g. physical appearance of preparation, duration and frequency of use/exposure, amount of substance, room size and ventilation rate. More general: The operational conditions include any action, use of tool or parameter state that prevails during manufacture or use of a substance (either in a pure state or in a preparation) that as a side effect might have an impact on exposure of humans and/ or the environment. **Oral route Oral** exposure can be direct (eating or drinking) or indirect such as from hand to mouth contact after touching a chemical. It can be either acute or chronic. **P90 or 90th** percentile The 90th percentile tells you the value for which 90% of the data points are lower and 10% higher.

PC Chemical product category: Element of the use descriptor system characterizing the type of chemical product in which the substance is (finally) used. Includes also intermediates and single substances marketed as chemical product. **PBT** Persistent, bioaccumulative, toxic PEC/PNEC Predicted environmental concentration /Predicted no effect concentration. **phys-chem** Physico-Chemical water. **PPE** Personal protective equipment **PROC** Process category: Element of the use descriptor system describing the type of technical processes applied during manufacturing and use. Respirable fraction Respirable dust approximates to the fraction of airborne material that penetrates to the gas exchange region of the lung. **RMM** Risk management measure: Measures that control the emission of a substance and/or exposure to it, thereby controlling the risks to human health or the environment. Risk management measures include e.g. containment of process, local exhaust ventilation, gloves, waste water treatment, exhaust air filters. More general: risk management
measures include any action, use of tool, change of parameter state that is introduced during manufacture or use of a substance (either in a pure state or in a preparation) in order to prevent, control, or reduce exposure of humans and / or the environment. **RCR** Risk characterization ratio. Outcome of hazard identification and risk estimation applied to a specific use of a substance or occurrence of an environmental health hazard: the assessment requires quantitative data on the exposure of organisms or people at risk in the specific situation. The end product is a quantitative statement about the proportion of organisms or people affected in a target population. **RPE** Respiratory Protection Equipment. Those are defined by their "assigned protection factor" as given in BS EN 529:2005. Any respiratory protective equipment (RPE) as defined below shall only be worn if the following principles are implemented in parallel: the duration of work exposure should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. **RWC** Reasonable Worst Case **SDS** Safety data sheet **Segregation** Isolation of the source from the work environment **Separation** Personal enclosure within a work environment **Short title of ES** Describes the uses and/or subsequent life cycle stages of a dangerous substance addressed in an exposure scenario. The short title of the ES should be consistent with the brief general description of use (see Annex I, point 5.1.1). The building blocks for the short title can be obtained from the use descriptor system (UDS). **STP** Sewage treatment plant **SU** Sectors of use: Element of the use descriptor system describing the sector of economy (industry, professional service, private) a substance is used in, as such or in a preparation. **TRA** See ECETOC TRA
TWA Time-weighted average exposure **UC** Use category: Means an exposure scenario covering a wide range of processes or uses, where the processes or uses are communicated, as a minimum, in terms of the brief general description of use. **UDS** Use descriptor system: Set of 4 descriptors which can be used i) to briefly describe identified uses in a brief general way and ii) to build the short title of an exposure scenario. The four descriptors are: sectors of use (SU), preparation/product category (PC), process category (PROC), article category (AC). **UEC** Use and exposure categories. **UVCB** Substances of unknown or vAirble composition, complex reaction products or biological materials as defined in the Guidance on substance identification. **vPvB** very persistent very bioaccumulative **WMM** Waste Management Measures. **WWTP** Waste Water Treatment Plant

End Of the Exposure Scenario