

MATERIAL SAFETY DATA

Hydrogen peroxide 35% solution.

Release date 14.06.2008

Review: 20.01.2021

Version EN: 8.0



This MSDA is accordant to Regulation EC 1907/2006 dated 18.12.2006 – REACH and 2020/878 dated 18.06.2010.

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

1.1. Product identifier Hydrogen peroxide 35% solution

Registration no. REACH: 01-211-9485845-22-0019

CAS: 7722-84-1

EC no. (EINECS): 231-765-0

Index no. 008-003-00-9

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

Identified use: raw material used for the synthesis of peroxides, as an oxidant in chemical reactions

, for production of rubber and plastics, the textile and pulp and paper industries, an etching agent in the electronics and metal industries, a bleaching agent, a neutralizer of wastewater in environmental protection and water treatment processes

Uses advised against: Not specified.

1.3. Data of the supplier of the MSDS

Distributor:

TOMCHEM Sp. z o.o.

95-050 Konstancinów Łódzki ul.

Niesięcin 5A

tel. 42 683-11-83

tel./fax.: 42-636-43-18

E-mail address of the person responsible for the material safety data sheet: info@spin-doradztwo.pl.

1.4. Emergency phone number 112 (general emergency phone), 998 (fire department), 999 (medical emergency);

SECTION 2: Identification of hazards

2.1. Classification of the substance or mixture

acc. to Regulation 1272/2008:

Acute Tox. 4; H302

Acute Tox. 4; H332

Skin Irrit. 2; H315

Eye Dam 1; H318

STOT SE 3; H335

Aquatic Chronic 3; H412

Hazard for human health

Harmful if swallowed. Harmful if inhaled. It causes serious eye damage. Skin irritating. May cause respiratory irritation.

Hazards for the environment

Harmful to aquatic life with long-lasting effects

Physical and chemical hazards

Heat is released during the decomposition reaction of the hydroxide peroxide. It has strong oxidizing properties.

Decomposition in a closed tank threatens to explode in the absence of adequate venting facilities.

2.2. Label elements

Pictographs:



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Warnings: Hazard

Hazard statement:

H302 - Harmful if swallowed

H315 - Skin irritating

H318 - Causes serious eye damage.

H332 - Harmful if inhaled.

H335 - May cause respiratory irritation.

H412 - Harmful to aquatic life with long lasting effects.

Precautionary phrases:

P280 – Wear protective gloves/protective clothing/eye protection/face protection.

P302 + P352 - IF ON SKIN: Wash with plenty of water with a soap.

P304+P340 - IF INHALED: If breathing is difficult, take an injured person to the fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P405 - Store locked up

2.3. Other hazards

Appendix XIII to the Regulation REACH - Criteria of identification of persistent, bioaccumulative and toxic substances (PBT) and very persistent and very bioaccumulative substances (vPvB) - not applicable

Substances with endocrine disrupting properties (according to the criteria of Commission Delegated Regulation (EU) 2017/2100, Commission Regulation (EU) 2018/605) - not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Product identifier	Content %	Hazard class and category codes	Hazard statement codes and supplementary phrases	- Specific threshold - M coefficient - Estimated Acute Toxicity (ATE)
Hydrogen peroxide* CAS: 7722-84-1 EC: 231-765-0 Index no. 008-003-00-9 REACH no. 01-2119485845-22-0019	35	Ox. Liq. 1 Skin Corr. 1A Acute Tox. 4 Acute Tox. 4	H271 H314 H302 H332	Ox. Liq. 1; H271: C ≥70 %**** Ox. Liq. 2; H272: 50% ≤ C < 70 % **** * 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%

Full text of H statements in section 16

*substance with a specific NDS value.

3.2. Mixtures

Not applicable.

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SECTION 4: First aid measures

4.1. Description of first aid measures In

case of skin contact:

Remove all soiled clothing, wash the skin with plenty of water. In case of irritation consult a doctor.

Contact with eyes:

Flush eyes for several minutes (approx. 15 min.) with plenty of water, keep the eyelids wide open. Avoid heavy jets because of a risk of a damage to the cornea, contact the doctor.

If inhaled:

In case of dizziness or nausea remove a victim to a fresh air; contact a doctor is the symptoms persist. If shortness of breath occurs, administer the oxygen.

If swallowed:

Give a large amount of water to drink. Do not induce vomiting, contact a doctor immediately. Never administer anything into the mouth if a victim is unconscious.

4.2. The most significant acute and delayed symptoms and effects of the exposure

Skin contact: irritation, drying, cracking, redness, swelling. Eye contact: chemical burns - risk of permanent eye damage.

Respiratory system: irritation of the mucous membranes of the nose, throat and downstream respiratory system. Gastrointestinal tract: chemical irritation of the mucous membranes of the mouth, tongue, throat, further sections of the gastrointestinal tract with the risk of perforation, symptoms of food poisoning, abdominal pain, nausea, vomiting.

4.3. Recommendations regarding immediate doctor's aid and detailed procedure of treatment of a victim.

Decision on how to proceed is made by a doctor after assessment of the condition of the affected person.

SECTION 5: Firefighting

5.1. Extinguishing media

Appropriate extinguishing media: Use extinguishing methods adjusted to adjacent area. The most effective extinguishing agent is water - use in the form of a dispersed stream.

Unsuitable extinguishing agents: do not use agents that accelerate the decomposition of hydrogen peroxide, i.e., protein. foaming agents.

5.2. Special hazards arising from the substance or mixture

Hydrogen peroxide does not exhibit flammable properties, but is a strong oxidizer and, when exposed to reducing agents, decomposes with the production of oxygen which sustains combustion. The decomposition of hydrogen peroxide in closed tanks in the absence of appropriate venting devices risks explosion.

5.3. Advice for firefighters

Containers in a fire area must be cooled down with a water spray. If this is possible remove the containers from the hazard zone. In case of fire in an enclosed area use protective clothing and compressed air breathing apparatus. Do not enable penetration of the ground waters and the sewage system.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: notify the relevant services of the accident. Remove everyone, who is not involved into the rescue operation, from the emergency liquidation area. Avoid contact with releasing liquid.

For persons providing aid. Ensure adequate ventilation, use personal protective equipment, isolate the area and remove sources of ignition. Do not breath vapors.

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6.2. Environment protection measures

Prevent from spreading and penetration of the sewage system and reservoirs; inform local authorities if it is impossible to assure safety.

6.3. Methods and materials preventing contamination and intended for cleaning up

Small quantities: Dilute with water enough so that the decomposition of hydrogen peroxide is not visible (intense gas bubble formation). Wash the surface thoroughly.

Large quantities: Collect the product into suitable containers for disposal. Store waste away from flammable products. Rinse off any residue with plenty of water.

6.4. References to other sections

Waste handling - see section 13 of the sheet.

Personal protective equipment - section 8 of the sheet.

SECTION 7: Handling and storage

7.1. Precautions regarding safe handling

Provide adequate ventilation. Avoid contact with eyes. Avoid contact with the skin. Avoid spilling. Avoid inhalation of product vapors. Work in accordance with safety and hygiene rules: do not eat or drink, do not smoke in the workplace, wash hands after use, remove contaminated clothing and protective equipment before entering eating areas.

7.2. Conditions for safe storage, including information on any incompatibilities Store in a cool, dry, well-ventilated area in a properly labeled closed original container. Avoid direct sunlights and sources of heat. Avoid hot areas and open flames. Store away from light metals, strong oxidizers and strong alkalis.

7.3. Specific end use(s)

Uses according to section 1.2 - no additional recommendations

See attached exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure standards for occupational hazards in accordance with Regulation of the Minister of Family, Labor and Social Policy dated 12 June 2018 on the highest permissible concentrations and intensities of factors harmful to health in the work environment (Journal of Laws item 1286 as amended).

Ingredients for which exposure limits are binding:

Name and CAS number of the chemical (substance)	Maximum allowable concentration (in mg/m ³) depending on exposure time during the work shift			Number of fibers (in cm) ³	Remarks: Notation of the substance: "skin"
	NDS	NDSch	NDSP		
Hydrogen peroxide [CAS: 7722-84-1]	0.4	0.8	-	-	-

DNEL (For employees):

Acute local effect - respiratory - 3mg/m³ Long-term local effect - respiratory -

1.4mg/m³ **PNEC:**

Fresh water: 0.0126mg/l

Fresh water, sediment: 0.0103 mg/kg wet sediment

Fresh water, sediment: 0.047 mg/kg dry sediment Soil:

0.0019 mg/kg wet soil

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Soil 0.0023 mg/kg dry soil

8.2. Exposure controls

See Appendix to the Material Safety Data Sheet: exposure scenarios for identified uses.

Work hygiene: General health and safety regulations are applied. Do not allow the workplace environment to exceed the permissible normative concentrations. Remove contaminated clothing after work - do not take home.

PN-86/Z-04050.01 – Air cleanses protection. Instruments and sets for sample collection. General provisions. PN-89/Z-04008.07 – Air cleanses protection. Sampling. General provisions. Rules of air samples collection in a work environment and interpretation of results.

Appropriate technical control measures: it is necessary to use general ventilation in the room. In the place of exposure to hydrogen peroxide, use stationary eye washers.

Personal protective equipment - individual protective equipment:



Eyes / face protection:

Use protective goggles or a face shield (according to standard EN 166).

Skin protection:

Hands protection:

Use chemical-resistant protective gloves made of natural rubber, PVC or equivalent according to EN-PN 374:2005.

Material of the gloves:

Selection of adjusted gloves depends on the material but also on a brand and quality assured by a manufacturer. Resistance of the material the gloves are made from may be determined after tests. Accurate gloves destroying time must be determined by a manufacturer.

Other:

Use protective work clothing (according to EN 344) - wash regularly.

Airways protection:

Avoid inhalation of product vapors. Under the conditions of exceeding the NDS (the highest permissible concentration) of the components in the working environment, use individual respiratory protection equipment - a mask or a half-mask complete with a filter and a type B or universal vapor absorber (class 2) according to EN 141.

Thermal hazards:

Not applicable.

Environment exposure control

Do not enable spreading in the environment and penetration of the sewage and water courses.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

a)	State:	Liquid
b)	Color	Clear
c)	Smell	Fragrance-free

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d)	Melting / solidification temperature (not applicable to gases)	-56°C ÷ -33°C
e)	Preliminary boiling temperature and range of boiling temperatures:	Approx. 107 ÷ 124°C
f)	Flammability of materials (applies to gases, liquids, solids)	Product is not flammable, it supports burning
g)	Lower and upper explosive limits (not applicable to solids)	Not applicable - does not pose an explosion hazard
h)	Flash point (not applicable to gases, aerosols and solids)	Not applicable
i)	Self-ignition temperature (applies to gases and liquids only)	It does not combust spontaneously
j)	Decomposition temperature (applies only to self-reactive substances and mixtures, organic peroxides and other substances and mixtures that can decompose)	No data
k)	pH (not applicable to gases)	1.5 – 4
l)	Kinematic viscosity (applies to liquids only)	No data
m)	Solubility	Solubility in water
n)	Partition coefficient n-octanol/water (log ratio value)	-1.57 (100% hydrogen peroxide)
o)	Vapor pressure	2000-3066Pa
p)	Density or relative density (applies to liquids and solids only)	1.07÷1.24 g/cm ³
q)	Relative vapor density (applies to gases and liquids only)	No data
r)	Particle characteristics (applies to solids only)	Not applicable

9.2. Other information

a)	Viscosity (dynamically)	1,248mPa (100% substance).
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SECTION 10: Stability and reactivity

10.1. Reactivity

The products of the decomposition reaction of hydrogen peroxide are water and oxygen; 1cm³ of the solution releases 10cm³ of oxygen. Heat is released during the decomposition reaction. Hydrogen peroxide has strong oxidizing properties.

10.2. Chemical stability

An unstable substance with high decomposition capacity, especially under the influence of catalytic impurities or elevated temperature. It is necessary to use stabilizers. Under conditions of proper storage and warehousing, the loss from concentrated solution is estimated at 1% per year.

10.3. Hazardous reactions

The decomposition reaction in the presence of catalysts can proceed explosively.

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10.4. Conditions to be avoided

Avoid elevated temperatures, direct sunlight, hot surfaces and open flames.

10.5. Incompatible materials

Strong bases, strong reducing agents, metals (iron, copper, chromium, manganese, platinum, silver), metal salts, charcoal, dust, organic matter.

10.6. Hazardous products of decomposition

At high temperatures, oxygen and heat are released.

SECTION 11: Toxicological Information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

a)	Acute toxicity	Harmful if swallowed. Harmful if inhaled.
b)	Caustic / skin irritation	On the basis of the available data the criteria of classification are not satisfied
c)	Serious damage to eyes/eye irritation:	It causes serious eye damage.
d)	Skin / airways sensitizing:	On the basis of the available data the criteria of classification are not satisfied
e)	Mutagenic for reproductive cells:	On the basis of the available data the criteria of classification are not satisfied
f)	Carcinogenicity:	On the basis of the available data the criteria of classification are not satisfied
g)	Reproductive toxicity	On the basis of the available data the criteria of classification are not satisfied
h)	Specific target organ toxicity - single exposure	May cause respiratory irritation.
i)	Specific target organ toxicity - repeated	On the basis of the available data the criteria of classification are not satisfied
j)	Hazards arising from aspiration	On the basis of the available data the criteria of classification are not satisfied

Toxicological data:

LD50 (oral, rat): > 1026 mg/kg LD50 (skin,

rabbit): > 2000 mg/kg

LC50 (inhalation, rat): > 170 mg/m³ (30 min.)

11.2. Information on other hazards

Information on exposure hazards:

Skin contact: causes irritation, cracking, redness, swelling. Eye contact: chemical irritation - causes serious eye damage.

Respiratory system: irritation of the mucous membranes of the nose, throat and downstream respiratory system. Gastrointestinal tract: chemical irritation of the mucous membranes of the mouth, tongue, throat, further sections of the gastrointestinal tract with the risk of perforation, symptoms of food poisoning, abdominal pain, nausea, vomiting.

Delayed direct and chronic effects of short-term and long-term exposure:

Acute poisoning causes more or less extensive tissue damage due to chemical burns and produces numerous systemic effects in the form of acid-base imbalance, water and electrolyte metabolism, causes a decrease in serum protein concentration, with high blood loss, symptoms of severe shock may occur.

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Effects of interaction:

No data

SECTION 12: Ecological information

12.1. Toxicity

Harmful to aquatic life with long-lasting effects

Acute toxicity

EC50 (aquatic invertebrates) - 2.4 mg/l (48h)

LC50 (freshwater fish) - 16.4 mg/l (24h) **Chronic**

toxicity:

NOEC (aquatic invertebrates) - 0.63mg/l

Inhibition of growth of algae

NOEC (algae) - 0.63mg/l

Toxicity to microorganisms

EC50 (microorganisms) - 466mg/l

12.2. Persistence and decomposition

The substance is easily biodegradable and subject to photolysis in the air. Half-life in air is about 24 hours.

12.3. Bio-accumulation

It does not bioaccumulate.

12.4. Mobility in a soil

Based on the physicochemical properties (high polarity and very good water solubility), high mobility in soil is expected.

12.5. Results of assessment of the PBT and the vPvB properties

Not applicable to inorganic substances.

12.6. Endocrine disrupting properties

A substance that does not disrupt the endocrine system.

12.7. Other harmful effects

No data

SECTION 13: Wastes disposal

13.1. Methods of wastes utilization

Dilute the spilled hydrogen peroxide with large amounts of water until the visible decomposition reaction disappears (intense gas bubbling). Disposal of waste and disposable packaging should be handled by specialized companies. Store the residues in the original containers. Dispose acc. to regulations in force. Empty, cleaned packaging should be disposed of (including recycling) in accordance with applicable regulations.

Determine waste codes at the place of production in accordance with the Ordinance of the Minister of Climate dated 2 January 2020 on the waste catalog (Journal of Laws, item 10):

Community regulations:

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

SECTION 14: Transport information

14.1. UN number or ID number

ADR/RID/IMDG/IATA: UN 2014

14.2. Correct UN transport name

ADR/RID: Hydrogen peroxide, aqueous solution containing not less than 20% and not more than 60% hydrogen peroxide (stabilized if necessary)

IMDG HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)

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IATA: Hydrogen peroxide, aqueous solution > 20% and <=40% hydrogen peroxide, stabilized as necessary

14.3. Transport hazard class

ADR/RID/IMDG/IATA: 5.1 +8

14.4. Packages group

ADR/RID/IMDG/IATA: II

14.5. Hazards for the environment

ADR/RID/IMDG/IATA: not applicable

14.6. Special precautions for users not applicable

transport always in closed containers that are upright, labeled and secured.

14.7. Sea transport in bulk in accordance with IMO instruments

IBC02; T7, TP2, TP6, TP24 ; L4BV9+), TU3, TC2, TE8, TE11, TT1.

Tanker transport vehicle: AT

SECTION 15: Regulatory information

15.1. Specific legal regulations regarding the safety, the health and the environment protection for a substance or a mixture.

1. Regulation (EC) No. 1907/2006 dated 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), as amended.
2. Commission Regulation (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No. 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
3. Regulation (EC) No. 1272/2008 of the European Parliament and of the Council dated 16 December 2008 (CLP) as amended.
4. Law dated 25 February 2011 on chemical substances and their mixtures (i.e. Journal of Laws 2019, item 1225).
5. Law dated 28 May 2020 on amendments to the Law on chemical substances and their mixtures and some other laws (Journal of Laws 2020, item 1337).
6. Law of 14 December 2012 on waste (i.e. Journal of Laws 2019, item 701). (Journal of (Laws, No. 2019, item 701).
7. Law dated 13 June 2013 on package and waste management (i.e. Journal of Laws of Laws 2019, item 542).
8. Regulation of the Minister of Climate of 2 January 2020 on the waste catalog (Journal of Laws 2020, item 10).
9. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
10. Announcement of the Speaker of the Sejm of the Republic of Poland dated 20 December 2019 on the announcement of the consolidated text of the Law on Transportation of Hazardous Goods (Journal of Laws 2020, item 154).
11. ADR Agreement 2019 - Government Statement of 18 February 2019 on the entry into force of the amendments to Annexes A and B to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), done at Geneva on 30 September 1957 (Journal Laws, item 769).
12. Ordinance of the Minister of Labor and Social Policy dated 12 June 2018 on permissible concentrations and strengths of compounds / substances harmful for health in the work environment (Journal of Laws, item 1286 as amended).
13. Ordinance of the Minister of Health dated 30 December 2004 on safety and hygiene of work related to existence of chemical agents at the work environment (i.e. (Journal of (Laws, No. 2016, item 1488).
14. Ordinance of the Minister of Health dated 9 December 2003 on substances which pose serious hazard for the environment (Journal of Laws No. 217, item 2172).

15.2. Assessment of the chemical safety

A chemical safety assessment was conducted for the substance.

Appendix XIV to the Regulation REACH Regulation - List of substances subject to authorization procedure: not applicable SVHC

Substances - Candidate list of substances of very high concern awaiting authorization:

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Not applicable

Appendix XVII to the Regulation REACH – Restrictions concerning production, entering into the market and application of some of hazardous substances: not applicable

Hydrogen peroxide is listed in Annex I to Regulation (EU) 2019/1148 on the marketing and use of explosives precursors. Acquisition, introduction, possession or use by average users is subject to restrictions. All suspicious transactions and significant cases of loss and theft must be reported to the National Contact Point within 24 hours of recognition or discovery.

SECTION 16: Other Information

H statements:

H271 - May cause a fire or an explosion; strong oxidant

H272 - May intensify fire; oxidiser

H302 - Harmful if swallowed

H314 - Causes severe skin burns and eye damage.

H315 – Causes skin irritation

H318 - Causes serious eye damage

H319 - Causes serious eye irritation

H332 - Harmful if inhaled.

H335 - May cause airway irritation

H412 - Harmful to aquatic life with long lasting effects.

Description of applied abbreviations, acronyms and symbols:

Ox. Liq. 1 – oxidizing liquid cat. 1

Ox. Liq. 2 – oxidizing liquid cat. 2

Acute Tox. 4 - acute toxicity cat.

Skin Corr. 1A – Caustic for skin cat. 1A

Skin Corr. 1B – Caustic for skin cat.

Eye Dam. 1 - Serious eye damage cat. 1

Skin Irrit. 2 – skin irritating, cat. 2

Eye Irrit. 2- Eye irritation cat. 2

STOT SE 3 – specific target organ toxicity - single exposure STOT SE 3

Aquatic Chronic 3 – Harmful for aquatic environment, cat. 3 NDS - the highest permissible concentration

NDSP – The Highest Upper Limit Concentration

NDSch – The Highest Temporary Concentration

DNEL - derived dose level (concentration) at which no harmful changes are observed. PNEC: Predicted No Effect Concentration

LC50 - (lethal concentration) - median lethal concentration, a statistically determined concentration of a substance, after exposure to which 50 percent of the organisms (exposed to the substance) can be expected to die during the exposure or during a specified contractual post-exposure period.

LD50 - (lethal dose) - medial lethal dose, the statistically determined size of a single dose of a substance, after administration of which 50% of exposed test organisms can be expected to die.

EC50 - (effective concentration) - medial effective concentration, statistically calculated concentration that induces in the environmental medium the specified effect in 50% of the experimental organisms under specified conditions

NOEC (no observed effects concentration) - the highest concentration for which there is no statistically or biologically significant increase in the frequency or severity of the effects of the substance in the test organisms relative to the control sample.

vPvB - Very persistent and very bioaccumulative substance

PBT - persistent, bioaccumulative and toxic substances

ADR – European agreement on the road transport of hazardous goods.

RID – Regulations Concerning the International Carriage of Dangerous Goods by Rail

IMDG – International Maritime Dangerous Goods Code

IATA – Regulation on the transport of dangerous goods issued by the International Air Transport Association

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Changes to the previous version:

Section:	Description:
Section 2	Change of an entry in accordance with Reg. 2020/878
Section 9	Change of an entry in accordance with Reg. 2020/878
Section 11	Change of an entry in accordance with Reg. 2020/878
Section 12	Change of an entry in accordance with Reg. 2020/878
Section 14	Change of an entry in accordance with Reg. 2020/878
Section 15	Regulatory change

Trainings:

Before commence of work with the product, an employee must take part in an obligatory OHS training since chemical agents are involved. Perform, document and familiarize employees with the results of risk assessment in the workplace with reference to the presence of chemical agents.

RESOURCES

Annex to Regulation (EU) 2020/878 dated 18 June 2020. Legal regulations referred to in section 15 of the MSDS. Information of the Office for Chemical Substances.

Information contained in the MSDS concern exclusively the product named in the title. The data contained in the data sheet should be considered only as an aid to the safe use of the product: **Hydrogen peroxide 35% solution**. Since conditions of storage and transport are beyond our control, we cannot give legal guarantees. Each time follow statutory regulations as well as regulations stipulated by potential third parties. The MSDS does not comprise an assessment of hazard at job. The product should not be used for purposes other than those laid down in the Section 1 without prior consultation with **TOMCHEM F.H.U.**

Developed at SPIN-DORADTWO www.spin-doradztwo.pl for **TOMCHEM F.H.U.**

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SN1

1. Title	Production and industrial use of hydrogen peroxide, production of mixtures
List of descriptors	<p>SU 3, 4, 8, 9, 11,12, 10, 14, 15,16, 17 ERC1: 2, 4, 6a, 6b, 6c, 6d PC: 0,1, 2, 8, 9a, 12, 14, 15, 20, 21, 23, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 37, 39 PROC: 1, 2, 3, 4, 5, 7, 10, 12, 13, 14, 15, 21</p>
Application sector [SU]:	<p>SU 3 Industrial uses: uses of substances as such or in preparations in industrial facilities SU 4 Manufacture of food products SU 8: Mass, large-scale production of chemicals (including petroleum products) SU 9: Production of high-value chemicals SU 11 Manufacture of rubber products SU 12 Manufacture of plastic products, including compounding and conversion SU 10 Formulation [mixing] and/or repackaging of mixtures (excluding alloys) SU 14 Production of base metals SU 15 Manufacture of fabricated metal products, except machinery and equipment SU 16 Manufacture of computers, electronic and optical products, manufacture of electrical equipment SU 17 General manufacturing, such as machinery, equipment, vehicles, other transportation equipment</p>
Category of the chemical product (PC)	<p>PC 0 (other: inorganic chemicals, additives for food) PC 1 Adhesives, sealants PC 2; Adsorbents PC 8 Biocidal products (e.g., disinfectants, pest control measures) PC 9a: Coatings and paints, thinners, paint removers PC 12 Fertilizers PC 14 Metal surface treatment products, including electroplating and electrocoating products PC 15 Products for machining non-metallic surfaces PC 20 Products from the groups of pH regulators, flocculants, precipitants, neutralizers PC 21: Laboratory chemicals PC 23 Leather tanning, dyeing, finishing, impregnation and care products PC 25: Metal working fluids PC 26 Paper and board dyeing, finishing and impregnation products: including bleaches and other auxiliary substances PC 27 Plant protection products PC 28 Perfumes, fragrances PC 29: Pharmaceuticals PC 31 Polishes and wax blends</p>

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	<p>PC 32 Polymer blends and compounds PC 33: Semiconductors PC 34 Textile dyeing, finishing and impregnation products, including bleaches and other auxiliaries PC 35 Washing and cleaning agents (including products based on solvents) PC 37 Water treatment chemicals PC 39: Cosmetics, personal care products</p>
<p>Process categories [PROC]:</p>	<p>PROC 1 Use in closed processes, no possibility of exposure PROC 2 Use in closed batch processes with sporadic, controlled exposure PROC 3 Use in closed batch processes (synthesis or formulation) PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises. PROC 5 Mixing in batch formulation processes of formulations or industrial products (multi-stage and/or significant contact). PROC 7 Industrial spraying PROC 10 Application by brush or roller PROC 12 Use of blowing agents in the manufacture of foams PROC 13 Treatment of industrial products by soaking or flooding PROC 14 Manufacture of mixtures or articles by tableting, pressing, extruding, pelletizing PROC 15 Use as laboratory reagents PROC 21 Low-energy manipulation of bound substances in industrial materials and/or products</p>
<p>Environmental Release Category [ERC]:</p>	<p>ERERC 1 Manufacture of substances ERC 2: Formulation of mixtures ERC 4 Industrial use of excipients in processes and products that will not become part of an article ERC 6a: Industrial use resulting in other substances (use of intermediates). ERC 6b: Industrial use of reactive excipients. ERC 6c: Industrial application of monomers for the production of thermoplastics. ERC 6d: Industrial use of excipients in the production of resins, rubber and polymers.</p>
<p>1.1.1 Causal scenario controlling environmental exposure</p>	
<p>1.1.1.1. Causal scenario controlling environmental exposure</p>	
<p>Name of the causal scenario</p>	<p>ERC 1 Manufacture of substances ERC 2: Formulation of mixtures ERC 4 Industrial use of excipients in processes and products that will not</p>

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	become part of the product ERC 6a: Industrial use resulting in other substances (use of intermediates). ERC 6b: Industrial application of reactive substances ERC 6c: Industrial application of monomers for the production of thermoplastics. ERC 6d: Industrial use of auxiliary substance in polymerization processes in the course of production of resins, rubber, polymers																																		
Other specifications	Not applicable																																		
2. Operating conditions and risk management measures																																			
Characteristics of the product	Liquid																																		
Volatility of the substance	Low																																		
Molecular weight (Molecular weight formerly called molecular weight)	34,02ppm na mg/m3																																		
Percentage of substance in the product	35 - 90%																																		
Quantities used	≤75,000 tons/year (production) ≤ 8950 tons/year (chemical synthesis) ≤ 1010 tons/year (chemical applications)																																		
Duration and frequency of use	Duration of employee exposure: > 4 hr / day Exposure control in a workplace: 220 days/year for a single worker Frequency of on-site emissions: 360 days/year (manufacturing); 300 days/year (chemical synthesis and applications:																																		
<table border="1"> <thead> <tr> <th>Parameter</th> <th>Production</th> <th>Chemical synthesis</th> <th>Applications of hydrogen peroxide</th> </tr> </thead> <tbody> <tr> <td>Regional annual production (number of tons)</td> <td>75000</td> <td>8950</td> <td>5050</td> </tr> <tr> <td>Local annual production (number of tons)</td> <td>75000</td> <td>8950</td> <td>1010</td> </tr> <tr> <td>Number of days</td> <td>360</td> <td>300</td> <td>300</td> </tr> <tr> <td>Quantities released, air</td> <td>0.0001%</td> <td>0.001%</td> <td>0.001%</td> </tr> <tr> <td>Quantities released, wastewater</td> <td>0.003%</td> <td>0.007%</td> <td>0.005%</td> </tr> <tr> <td>Quantities released, soil</td> <td>0.0001</td> <td>0.0001</td> <td>0.0001</td> </tr> <tr> <td>Local emissions, air (kg/days)</td> <td>20.8</td> <td>29.8</td> <td>3.37</td> </tr> </tbody> </table>				Parameter	Production	Chemical synthesis	Applications of hydrogen peroxide	Regional annual production (number of tons)	75000	8950	5050	Local annual production (number of tons)	75000	8950	1010	Number of days	360	300	300	Quantities released, air	0.0001%	0.001%	0.001%	Quantities released, wastewater	0.003%	0.007%	0.005%	Quantities released, soil	0.0001	0.0001	0.0001	Local emissions, air (kg/days)	20.8	29.8	3.37
Parameter	Production	Chemical synthesis	Applications of hydrogen peroxide																																
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Quantities released, soil	0.0001	0.0001	0.0001																																
Local emissions, air (kg/days)	20.8	29.8	3.37																																
Conditions and technical measures at the process (source) level to prevent release	Production processes are usually carried out continuously, in a closed system. During normal operation, the reactor is closed and exposure																																		

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of substances	to hydrogen peroxide vapors is virtually non-existent.
Other data operational conditions affecting environmental exposure	No
Local conditions and technical measures to reduce or limit the discharge of substances into surface water, emissions of substances into the air and release of substances into the soil	The most common method of neutralizing wastewater containing hydrogen peroxide is neutralization in a biological wastewater treatment plant. Hydrogen peroxide is decomposed by microorganisms into carbon dioxide, water and activated sludge. Activated sludge is separated from the wastewater and returned to the aeration chamber
Organizational measures to eliminate/reduce the release of substances from the plant	Combination of organizational and technical measures (containment and early detection of leaks) should be implemented at the plant, with the goal to eliminate or significantly reduce the release of the substance from the plant, or to quickly recognize that the substance is accidentally released.
Conditions and measures related to the municipal wastewater treatment plant	Industrial plants, as long as they have the appropriate permits, can be connected to a municipal wastewater treatment plant. Due to the presence of organic matter in the wastewater, hydrogen peroxide has a short half-life (about 6 minutes). Approximately 97% of the total amount of hydrogen peroxide will be neutralized during the first 30 minutes of contact between peroxide and wastewater. Capacity of the municipal sewage treatment plant: 2000 m ³ /d
Conditions and measures related to the processing/recovery of waste for disposal from the enterprise by an outside company	Closed loop feeding of large waste storage tanks (>200l)
Conditions and measures related to processing/recovery of waste for an external company	
Type of waste	Liquid and solid waste
Removal techniques	The waste should be treated as industrial waste and should be incinerated in a thermal combustion chamber, which will allow the complete removal of hydrogen peroxide.
Fractions likely to be released into the environment	Hydrogen peroxide is very reactive and will decompose when in contact with other waste. No emissions are expected
Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure in reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.	
If there is no access to a municipal wastewater treatment plant, then biological treatment is recommended before it is discharged into the environment.	

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2.1 Control of worker exposure	
2.1.1 Control of worker exposure: contributory scenario 1.	
Name of the causal scenario	PROC 1 Use in closed processes, no possibility of exposure PROC 2 Use in closed batch processes with sporadic, controlled exposure PROC 3 Use in closed batch processes (synthesis or formulation) PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises. PROC 5 Mixing in batch formulation processes of formulations or industrial products (multi-stage and/or significant contact). PROC 7 Industrial spraying PROC 10 Application by brush or roller PROC 12 Use of blowing agents in the manufacture of foams PROC 13 Treatment of industrial products by soaking or flooding PROC 14 Manufacture of preparations or products by tableting, pressing, extruding and granulating. PROC 15 Use as laboratory reagents PROC 21 Low-energy manipulation of bound substances in materials and/or industrial products
Other specifications	Hydrogen peroxide applications: laboratory chemicals, products for tanning, dyeing, finishing, impregnation and care of leather, metalworking fluids, products for dyeing, finishing and impregnation of paper and board: including bleaches and other auxiliary substances, plant protection products, perfumes, fragrances, pharmaceuticals, polishes and wax blends, polymer blends and compounds, semiconductors, textile dyeing, finishing and impregnation products, including bleaches and other auxiliaries, washing and cleaning products (including solvent-based products), water treatment chemicals, cosmetics and personal hygiene products .
Characteristics of the product	See above
Quantities used	≤75,000 tons/year (production) ≤ 8950 tons/year (chemical synthesis) ≤ 1010 tons/year (chemical applications)
Duration and frequency of use	Duration of employee exposure: > 4 hr / day Exposure control in a workplace: 220 days/year for a single worker Frequency of on-site emissions: 360 days/year (manufacturing); 300 days/year (chemical synthesis and applications)
Human factors beyond influence	Workers may be exposed to

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risk control	hydrogen peroxide through inhalation and dermal contact. Short-term exposure to concentrated peroxide solutions is possible (sampling for analysis, during distillation, stabilization or during work in a laboratory)
Other data operational conditions affecting employee exposure	The frequency and duration of exposure varies depending on workers' tasks. Some tasks may result in increased short-term exposures. If this is the case, workers should use additional risk management measures (e.g., personal protective equipment)
Conditions and technical measures at the process (source) level to prevent release of substances	Production processes are usually carried out continuously, in a closed system. During normal operation, the reactor is closed and exposure to hydrogen peroxide vapors is virtually non-existent. Where there is a possibility of contact with concentrated peroxide solutions local exhaust ventilation should be used.
Local conditions and technical measures to control the dispersion of substances from the source into the direction of the employee	When using dilute hydrogen peroxide solutions in an open system (such as surface etching) local exhaust ventilation can be used.
Organizational measures to eliminate/reduce the release, dispersion of substances and exposure of workers	People in contact with hydrogen peroxide should be trained in occupational health and safety. During unloading, containers and drums containing hydrogen peroxide should be checked for leaks and cleanliness
Conditions and measures related to personal protection, hygiene and health protection	
Technical protective measures	Local exhaust ventilation is required for vapor exposure
Respiratory track protection	In case of exposure to vapors or aerosols, use respiratory protection (e.g., gas mask with NO type absorber)
Hands protection	Required protective gloves (e.g., PVC, rubber)
Eye protection	Chemical-resistant goggles or face protection required
Chemical-resistant goggles or face protection required	Protective clothing is required
Occupational safety and hygiene	Keep away from food, beverages and tobacco products. Wash hands after each contact with the substance. Use ointments to protect the skin of the hands. In case of contamination, remove all contaminated clothing immediately. In case of skin contact, wash contaminated skin immediately.
Additional tips for good professional practice beyond the scope of	

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chemical safety assessment in accordance with Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.

Sensors indicating a leak and automatically controlled valves should be installed to protect workers from accidental and uncontrolled release of a substance.
 Periodic training of employees should include information on the risks of using the substance and when they are directly exposed to the substance, at the same time they should be trained in safe procedures in case of accidental and uncontrolled release of a substance

3. Exposure estimation and references in the context of their source

Workers (swallow)	Application of good industrial practice eliminates the possibility of exposure by ingestion by employees		
Workers (dermal exposure)	Workers in contact with 35% hydrogen peroxide solution are required to wear a proper eye and skin protection		
Workers (inhalation), RMMs PROC 1, none PROC 2, LEV 90% PROC 3, LEV 90% PROC 4, LEV 90% PROC 5, LEV 90% PROC 7, LEV 90%, PRE 95% PROC 10, LEV 90% PROC 12, LEV 80% PROC 13, LEV 90% PROC 14, LEV 90% PROC 15, LEV 90%	Estimated based on ECETOC TRA (maximum concentrations) 0.014 mg/m3 (90% w/w) 0.142 mg/m3 (90% w/w) 0.298 mg/m3 (70% w/w) 0.496 mg/m3 (70% w/w) 0.496 mg/m3 (70% w/w) 0.425 mg/m3 (60% w/w) 0.85 mg/m3 (60% w/w) 0.34 mg/m3 (60% w/w) 0,85 mg/m3 (60% w/w) 0.425 mg/m3 (60% w/w) 0.496 mg/m3 (70% w/w)		
Consumers	Not applicable		
Environment (predicted concentrations in the environment (PEC's) - maximum values)	Estimated using EUSES		
	Production	Chemical synthesis	Applications
Fresh water	0.009mg/l	0.0063mg/l	0.0086mg/l
Sea water	0.0015mg/l	0.0006mg/l	0.0008mg/l
Soil	1.45 x 10-4	1.51 x 10-4	1.17 x 10-4
Wastewater treatment plants	mg/kg	mg/kg	mg/kg
People/environment	0.63 mg/l	0.146 mg/l	0.059 mg/l

The following table can be used to determine the maximum allowable concentration of hydrogen peroxide in wastewater (in a wastewater treatment plant) depending on the volume of wastewater flows and collection of waters.

Total volumetric flow (m3/day)	Volumetric flow in fresh or salt water								
	100	250	500	750	1000	10000	10000	100000	1000000
Maximum allowable concentration of hydrogen peroxide in wastewater mg/l									
100	0.025	0.044	0.075	0.107	0.139	1.273	12.613	126.014	1260.030
250	0.017	0.025	0.037	0.050	0.063	0.517	5.058	50.413	504.020
500	0.015	0.018	0.025	0.032	0.038	0.265	2.533	25.213	252.016
750	0.014	0.016	0.021	0.025	0.030	0.181	1.693	16.813	168.014

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1000	0.013	0.015	0.019	0.022	0.025	0.139	1.227	12.613	126.014
1500	0.013	0.015	0.017	0.019	0.021	0.097	0.853	8.413	84.013
2000	0.013	0.014	0.016	0.017	0.019	0.076	0.643	6.313	63.013
5000	0.012	0.013	0.014	0.015	0.015	0.038	0.265	2.533	25.213
10000	0.012	0.013	0.013	0.014	0.014	0.025	0.139	1.273	12.613

4. Guidance for downstream users to help determine if they are working within the limits of the Exposure Scenario defined herein

If there is a risk of exposure, the personal protection measures recommended above should be used. In addition to the use of Technical Control Measures, i.e. adequate ventilation values of the maximum permissible concentrations should be monitored. If they are exceeded, additional personal protective equipment should be used, e.g.: respirators, etc.

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SN2

1. 1 Title	Loading and unloading of hydrogen peroxide, distribution with all uses identified
List of descriptors:	SU 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 21, 22 ERC 1, 2, 4, 6a, 6b, 6c PC 1, 8, 12, 14, 15, 21, 25, 27, 29, 31, 32, 34, 35, 37, 39 PROC 8a, 8b, 9
Application sector [SU]:	SU 3 Industrial uses: uses of substances as such or in preparations in industrial facilities SU 4 Food manufacturing SU 5 Manufacture of textiles, leather, furs SU 6 Manufacture of pulp, paper and paper products SU 8 Bulk, large-scale production of chemicals (including petroleum products) SU 9: Production of high-value chemicals SU 10 Formulation [mixing] and/or repackaging of mixtures (excluding alloys) SU 11 Manufacture of rubber products SU 12 Manufacture of plastic products, including compounding and conversion SU 14 Production of base metals SU 15 Manufacture of fabricated metal products, except machinery and equipment SU 16 Manufacture of computers, electronic and optical products, manufacture of electrical equipment SU 17 General manufacturing, such as machinery, equipment, vehicles, other transportation equipment SU 21 Consumer applications: households (= general public = consumers) SU 22 Professional applications: public domain (administration, educational system, entertainment, services, craft)
Category of the chemical product (PC)	PC 1 : Adhesives, sealants PC 8 :Biocidal products (e.g. disinfectants, pest control products) PC 12 : Fertilizers PC 14 Metal surface treatment products, including electroplating and electrocoating products PC 15 Products for machining non-metallic surfaces PC 21 Laboratory chemicals PC 25: Metalworking fluids PC 27: Plant protection products PC 29: Pharmaceuticals PC 31 Polishes and wax blends PC 32: Polymer blends and compounds PC 34 Textile dyeing, finishing and impregnation products, including bleaches and other excipients

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	PC 35 Washing and cleaning agents (including products based on solvents) PC 37 Water treatment chemicals PC 39: Cosmetics, personal care products
Process categories [PROC]:	PROC 8a: Use in closed processes, no possibility of exposure PROC 8b: Use in closed batch processes with sporadic, controlled exposure PROC 9 Use in closed batch processes (synthesis or formulation)
Environmental Release Category [ERC]:	ERC 1 Manufacture of substances ERC 2: Formulation of mixtures ERC 4 Industrial use of excipients in processes and products that will not become part of an article ERC 6a: Industrial use resulting in other substances (use of intermediates). ERC 6b: Industrial use of reactive excipients. ERC 6c: Industrial application of monomers for the production of thermoplastics.
Other information	The scenario describes the processes and activities involved in loading and unloading operations performed under identified conditions. It includes: filling of containers at production sites, delivery of raw material, transfer of substances from transport containers to storage tanks, storage of raw material in reactors or tanks used for dilution of the product. The scenario also includes different concentrations of the hydrogen peroxide
1.1.1 Exposure Scenario 1	
1.1.1.1. Causal scenario controlling environmental exposure	
Name of the causal scenario	ERC 1 Manufacture of substances ERC 2: Formulation of mixtures ERC 4 Industrial use of process and product excipients that will not become part of an article ERC 6a: Industrial use resulting in other substances (use of intermediates). ERC 6b: Industrial application of reactive substances ERC 6c: Industrial application of monomers for the production of thermoplastics.
Other specifications	Not applicable
Characteristics of the product	Liquid
Volatility of the substance	Low
Molecular weight (Molecular weight formerly called molecular weight)	34.02 ppm per mg/m ³
Percentage of substance in the product	30 - 90%
Quantities used	Risk management measures, together with the operational conditions of application, ensure that proper risk control is maintained regardless of the stage of the process and the quantities of involved

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	substance.
Frequency and duration of use/exposure	Duration of employee exposure: 8 hr / day Exposure control in a workplace: 220 days/year for a single worker Frequency of on-site emissions: No emissions
Environmental indicators not covered by risk control	Average flow in the receiving river : ³ 18000 m3/day(default value)
Other data operational conditions affecting environmental exposure	Indoor/Outdoor. No significant emissions to the environment (based on EU Risk Assessment Report, European Commission 2003).
Conditions and technical measures at the process (source) level to prevent release of substances	Containers and containers should be made of carefully selected grades of steel (to avoid decay). The maximum concentration of the substance is 70%, and the maximum capacity of the tank is 40 m ³ . Tanks used for storing large quantities of substances should be made of passivated aluminum or stainless steel, and their capacity should not exceed 1000 m ³ . These tanks should be located outdoors. They should be protected from leakage by being placed on a concrete base and controlling the filling. Accidentally occurring leaks flush with water. Hydrogen peroxide can also be stored in smaller containers such as drums, IBCs (DPPLs). For peroxide with a concentration of 60%, it is recommended to store in containers made of special grades of high-density polyethylene. A more concentrated solution requires specific packaging made of aluminum or stainless steel.
Local conditions and technical measures to reduce or limit the discharge of substances into surface waters, emissions into the air and release into the soil	Not applicable
Organizational measures to eliminate/reduce the release of the substance from the plant	No significant emissions to the environment (based on EU Risk Assessment Report, European Commission 2003)
Conditions and measures related to the municipal wastewater treatment plant	Not applicable
Conditions and measures related to the processing/recovery of waste to be disposed of from the enterprise through a third-party company	Air: No emissions Sewage: No waste In case of leakage, wash off with plenty of water. Transfer contaminated water to an industrial wastewater treatment plant. Solid and liquid wastes: Under normal conditions of use waste does not occur.
Conditions and measures related to processing/recovery of waste for an external company	
Type of waste	Liquid and solid waste
Removal techniques	The waste should be treated as industrial waste and should be incinerated in a thermal combustion chamber, which will allow the

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	complete removal of hydrogen peroxide.
Fractions likely to be released into the environment	Hydrogen peroxide is very reactive and will decompose when it comes into contact with other wastes. No emissions are expected
Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not have to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of REACH Regulation.	
Not applicable	
1.1.2. 1.1.2 Control of worker exposure: contributory scenario No. 1	
Name of the causal scenario	PROC 8a: Use in closed processes, no possibility of exposure PROC 8b: Use in closed batch processes with sporadic, controlled exposure PROC 9 Use in closed batch processes (synthesis or formulation)
Other specifications	Not applicable
Characteristics of the product	See above
Quantities used	Risk management measures, together with the operational conditions of application, ensure that proper risk control is maintained regardless of the stage of the process and the quantities of involved substance.
Duration and frequency of use	Duration of employee exposure: 8 hr / day Exposure control in a workplace: 220 days/year for a single employee Frequency of on-site emissions: No emissions
Human factors beyond the influence of risk control	Batch processes are conducted in a closed system. Possible short-term exposure may occur during maintenance of the batch system. No exposure to consumers is anticipated in the above identified uses.
Other data operational conditions affecting employee exposure	Not applicable
Conditions and technical measures at the process (source) level to prevent release of substances	Containers and containers should be made of carefully selected grades of steel (to avoid decay). The maximum concentration of the substance is 70%, and the maximum capacity of the container is 40 m. Tanks used for storing large quantities of substance should be made of passivated aluminum or stainless steel, and the capacity should not exceed 1000 m ³ . These tanks should be located outdoors. They should be protected from leakage by being placed on a concrete base and controlling the filling. Flush any accidental leaks with water. Hydrogen peroxide can also be stored in smaller containers such

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	as: drums, IBCs (DPPL). For peroxide with a concentration of 60%, it is recommended to store in containers made of special grades of high-density polyethylene. A more concentrated solution requires use of specific packaging made of aluminum or stainless steel.
Local conditions and technical measures to control the dispersion of the substance from the source towards the worker	Not applicable
Organizational measures to eliminate/reduce the release, dispersion of substances and exposure of workers	People in contact with hydrogen peroxide should be trained in occupational health and safety. During unloading, containers and drums containing hydrogen peroxide should be checked for tightness and cleanliness.

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

Technical protective measures	Local exhaust ventilation is required for vapor exposure
Respiratory track protection	In case of exposure to vapors or aerosols, use respiratory protection (e.g., gas mask with NO type absorber)
Hands protection	Required protective gloves (e.g., PVC, rubber)
Eye protection	Chemical-resistant goggles or face protection required
Chemical-resistant goggles or face protection required	Protective clothing is required
Occupational safety and hygiene	Keep away from food, beverages and tobacco products. Wash hands after each contact with the substance. Use ointments to protect the skin of the hands. In case of contamination, remove all contaminated clothing immediately. In case of skin contact, wash contaminated skin immediately.

Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.

Sensors indicating a leak and automatically controlled valves should be installed to protect workers from accidental and uncontrolled release of a substance.

Periodic training of employees should include information on the risks of using the substance and when they are directly exposed to the substance, at the same time they should be trained in safe procedures in case of accidental and uncontrolled release of the substance.

2. Exposure estimation and references in the context of their source

Workers (swallow)	Application of good industrial practice eliminates the possibility of exposure by ingestion by
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	employees
Workers (dermal exposure)	Workers in contact with $\leq 35\%$ hydrogen peroxide solution are required to wear appropriate eye and skin protection
Workers (inhalation), RMMs PROC 8a, LEV 90% PROC 8b, LEV 97% PROC 9, LEV 90%	Estimated based on ECETOC TRA (maximum concentrations) 0.99 mg/m ³ (70% w/w); 90% solution 0.21 mg/m ³ (90% w/w) 0.71 mg/m ³ (90% w/w)
Consumers	Not applicable
Environment	No emissions to the environment
3. Guidance for downstream users to help determine if they are working within the limits of the Exposure Scenario defined herein	
If there is a risk of exposure, the personal protection measures recommended above should be used. In addition to the use of technical control measures, i.e. adequate ventilation, the values of the maximum allowable concentrations should be monitored. If they are exceeded use additional personal protective equipment, e.g.: protective respirators, etc.	

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SN3

1. 1 Title	Identified uses of hydrogen peroxide in bleaching processes
List of descriptors:	SU 3, 5, 6, 21, 22 ERC 4, 6b, 8a, 8b, 8e PC 23, 24, 26, 34 PROC 1, 2, 3, 4, 13, 19
Application sector [SU]:	SU 3 Industrial uses: uses of substances as such or in preparations in industrial facilities SU 5 Manufacture of textiles, leather, furs SU 6 Manufacture of pulp, paper and paper products SU 21 Consumer applications: households (= general public = consumers) SU 22 Professional applications: public domain (administration, education, entertainment, services, crafts)
Category of the chemical product (PC)	PC 23 Leather tanning, dyeing, finishing, impregnation and care products PC 24: Lubricants, greases and release products PC 26 Paper and board dyeing, finishing and impregnation products: including bleaches and other excipients PC 34 Textile dyeing, finishing and impregnation products, including bleaches and other excipients
Process categories [PROC]:	PROC 1 Use in closed processes, no possibility of exposure PROC 2 Use in closed batch processes with sporadic, controlled exposure PROC 3 Use in closed batch processes (synthesis or formulation) PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises. PROC 13 Treatment of industrial products by soaking or flooding PROC 19 Hand-mixing with close contact with the substance and availability of personal protective equipment only
Environmental Release Category [ERC]:	ERC 4 Industrial use of excipients in processes and products that will not become part of an article ERC 6b: Industrial use of reactive excipients. ERC8a: Widely dispersed use, indoors, of excipients in open systems ERC8b: Widely dispersed use, indoors, of reactive excipients in open systems ERC8e: Widely distributed use, outdoors, of reactive substances in open systems

MATERIAL SAFETY DATA**Hydrogen peroxide 35% solution.**

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Other information	<p>The scenario describes the processes and activities involved in carrying out the bleaching process in automated, semi-automated and manual conditions. Bleaching is carried out using aqueous hydrogen peroxide solutions in industrial and professional applications.</p> <p>The exposure scenario also includes consumer applications involving hydrogen peroxide-based bleaching products.</p> <p>It also covers use of hydrogen peroxide in pulp bleaching processes during paper production, bleaching of fibers and other fibrous materials and products (such as carpets), and use of peroxide as a bleaching agent in industrial laundries and in private homes.</p>										
1.1.1 Exposure Scenario 1											
1.1.1.1. Causal scenario controlling environmental exposure											
Name of the causal scenario	<p>ERC 4 Industrial use of excipients in processes and products that will not become part of an article ERC 6b: Industrial use of reactive excipients. ERC8a: Widely dispersed use, indoors, of excipients in open systems ERC8b: Widely dispersed use, indoors, of reactive excipients in open systems ERC8e: Widely dispersed application, outdoors, of substances reacting in the open systems</p>										
Other specifications	Not applicable										
Characteristics of the product	Liquid										
Volatility of the substance	Low										
Molecular weight (Molecular weight formerly called molecular weight)	34.02 ppm per mg/m ³										
Percentage of substance in the product	≤35%										
Quantities used	Not applicable										
Frequency and duration of use/exposure											
Duration and frequency of use (employees)											
<table border="1"> <thead> <tr> <th>Parameter</th> <th>Mass bleaching, cellulose, decolorization</th> <th>Bleaching of fibers and other non-fibrous materials</th> </tr> </thead> <tbody> <tr> <td>Duration of employee exposure</td> <td>8 h/day</td> <td>8 h/day</td> </tr> <tr> <td>Frequency</td> <td>220 days/year for</td> <td>220 days/year for</td> </tr> </tbody> </table>	Parameter	Mass bleaching, cellulose, decolorization	Bleaching of fibers and other non-fibrous materials	Duration of employee exposure	8 h/day	8 h/day	Frequency	220 days/year for	220 days/year for		
Parameter	Mass bleaching, cellulose, decolorization	Bleaching of fibers and other non-fibrous materials									
Duration of employee exposure	8 h/day	8 h/day									
Frequency	220 days/year for	220 days/year for									

MATERIAL SAFETY DATA

Hydrogen peroxide 35% solution.



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	exposure in a workplace	single employee	single employee
	Frequency of the emission at localization:	360 days	300 days
Duration and frequency of use (consumers)			
	Parameter	Mass bleaching, cellulose, decolorization	Bleaching of fibers and other non-fibrous materials
	Duration of consumer exposure	10 minutes (one-time application)	
	Frequency - consumer exposure	3-4 days a week	
	Quantity used	100 ml of whitening product / one time use	
Environmental indicators not covered by risk control		Average flow in the receiving river : ≥18000 m3/day (default value)	
Other data operational conditions affecting environmental exposure:			
<ul style="list-style-type: none"> • Work indoors and outdoors. • Other data - operating conditions 			
	Parameter	Pulp bleaching, decolorization	Bleaching (Other uses)
	Quantities released, air	0.001%	0.001%
	Quantities released, sewage	0.009%	0.005%
	Quantities released, soil	0.0001%	0.001%
	Quantities of wastewater discharged (fresh water)	17500 m3/day	2000 m3/day
	Dilution factor (fresh water)		
	Dilution factor (salt water)	10 100	10 100
Conditions and technical measures at the process (source) level to prevent release of substances		The only source of substance release is generation of biodegradable wastewater. Small amounts of the substance contained in bleaching products (used by both consumers and professionals) can constitute municipal waste.	
Local conditions and technical measures to reduce or limit discharges for substances discharged into surface waters,		The most common method of neutralizing of wastewater containing hydrogen peroxide is neutralization in a biological wastewater treatment plant. Hydrogen peroxide	

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Hydrogen peroxide 35% solution.



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<p>emissions into the air and release into the soil</p>	<p>is decomposed by microorganisms into carbon dioxide, water and activated sludge Activated sludge is separated from the wastewater and returned to the aeration chamber. Wastewater is treated at the city's wastewater treatment plant with a capacity of 2,000 m³ /day (default value) and an efficiency of 99.3%.</p>
<p>Organizational measures to eliminate/reduce the release of substances from the plant</p>	<p>A combination of organizational and technical measures (spill containment and early detection) should be implemented at the plant to eliminate or significantly reduce the release of substances from the plant, or to quickly recognize that a substance is being accidentally released.</p>
<p>Conditions and measures related to the municipal wastewater treatment plant</p>	<p>It is assumed that the city's wastewater treatment plant is for 10,000 residents, where each produces 200 liters of wastewater per day, making 2,000,000 l total wastewater/day</p>
<p>Conditions and measures related to the processing/recovery of waste to be disposed of from the enterprise through a third-party company</p>	<p>Air Emissions may occur if carbon filters that reduce gas emissions are worn out. Sewage: Industrial wastewater must be neutralized with: <ul style="list-style-type: none"> • Biological wastewater treatment plant, or • by the ozonation method Dispose of the wastewater generated by the bleaching process (for both professional and consumer applications) into the public sewer system. There will be rapid decomposition of hydrogen peroxide. Solid and liquid wastes (industrial uses): Consider as industrial waste Solid and liquid waste (professional and consumer applications): Dispose of as municipal waste</p>
<p>Conditions and measures related to processing/recovery of waste for an external company</p>	
<p>Type of waste</p>	<p>Liquid and solid waste</p>
<p>Removal techniques</p>	<p>The waste should be treated as industrial waste and should be incinerated in a thermal combustion chamber, allowing for complete removal of hydrogen peroxide.</p>
<p>Fractions likely to be released into the environment</p>	<p>Hydrogen peroxide is very reactive and will decompose when it comes into contact with other wastes. No emissions are expected</p>
<p>Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not have to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of REACH Regulation.</p>	
<p>If there is no access to a municipal wastewater treatment plant, then biological treatment of wastewater before it is discharged into the environment is recommended.</p>	
<p>1.1.2. 1.1.2 Control of worker exposure: contributory scenario No. 1</p>	
<p>Name of the causal scenario</p>	<p>PROC 1 Use in closed processes, no possibility of exposure</p>

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Hydrogen peroxide 35% solution.



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	PROC 2 Use in closed batch processes with sporadic, controlled exposure PROC 3 Use in closed batch processes (synthesis or formulation) PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises. PROC 13 Treatment of industrial products by soaking or flooding PROC 19 Manual mixing with close contact with substance and availability of personal protective equipment only														
Other specifications	Not applicable														
Characteristics of the product	See above														
Quantities used	Not applicable														
Duration and frequency of use															
Duration and frequency of use (employees)															
Duration	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Mass bleaching, cellulose, decolorization</th> <th>Bleaching of fibers and other non-fibrous materials</th> </tr> </thead> <tbody> <tr> <td>Duration of employee exposure</td> <td>8 h/day</td> <td>8 h/day</td> </tr> <tr> <td>Exposure control in a workplace:</td> <td>220 days/year for a single worker</td> <td>220 days/year for a single worker</td> </tr> <tr> <td>Frequency of on emissions at the localization:</td> <td>360 days</td> <td>300 days</td> </tr> </tbody> </table>	Parameter	Mass bleaching, cellulose, decolorization	Bleaching of fibers and other non-fibrous materials	Duration of employee exposure	8 h/day	8 h/day	Exposure control in a workplace:	220 days/year for a single worker	220 days/year for a single worker	Frequency of on emissions at the localization:	360 days	300 days		
	Parameter	Mass bleaching, cellulose, decolorization	Bleaching of fibers and other non-fibrous materials												
	Duration of employee exposure	8 h/day	8 h/day												
	Exposure control in a workplace:	220 days/year for a single worker	220 days/year for a single worker												
Frequency of on emissions at the localization:	360 days	300 days													
and frequency of use (consumers)															
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Pulp bleaching, decolorization</th> <th>Bleaching of fibers and other non-fibrous materials</th> </tr> </thead> <tbody> <tr> <td>Duration of consumer exposure</td> <td colspan="2">10 minutes (one-time application)</td> </tr> <tr> <td>Frequency - consumer exposure</td> <td colspan="2">3-4 days a week</td> </tr> <tr> <td>Quantity used</td> <td colspan="2">100 ml of whitening product / one time use</td> </tr> </tbody> </table>	Parameter	Pulp bleaching, decolorization	Bleaching of fibers and other non-fibrous materials	Duration of consumer exposure	10 minutes (one-time application)		Frequency - consumer exposure	3-4 days a week		Quantity used	100 ml of whitening product / one time use			
Parameter	Pulp bleaching, decolorization	Bleaching of fibers and other non-fibrous materials													
Duration of consumer exposure	10 minutes (one-time application)														
Frequency - consumer exposure	3-4 days a week														
Quantity used	100 ml of whitening product / one time use														
Human factors beyond the influence of risk control	Workers may be exposed to hydrogen peroxide through inhalation and contact with skin														
Other data operational conditions affecting employee exposure	Work indoors and outdoors														
Conditions and technical measures at the process (source) level to prevent release of substances	Process lines for dilution Concentrated hydrogen peroxide solutions work in a closed system (no exposure, or														

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Hydrogen peroxide 35% solution.

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	sporadic, fully controlled exposure) and they are fully automated. When the processing line is not fully automated, the number of people performing activities in the manual mode is minimized.
Local conditions and technical measures to control the dispersion of the substance from the source towards the worker	In paper production plants, process lines are fully enclosed, or the number of people performing manual operations is minimized. Local exhaust ventilation is used. In large plants using hydrogen peroxide in the bleaching process, the mechanical ventilation and local exhaust ventilation should be used.
Organizational measures to eliminate/reduce the release, dispersion of substances and exposure of workers	People in contact with hydrogen peroxide should be trained in occupational health and safety. When unloading containers and drums containing the hydrogen peroxide they should be checked for leaks and cleanliness

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

Technical protective measures	Local exhaust ventilation is required for vapor exposure
Respiratory track protection	In case of exposure to vapors or aerosols, use respiratory protection (e.g., gas mask with NO type absorber)
Hands protection	Required protective gloves (e.g., PVC, rubber)
Eye protection	Chemical-resistant goggles or face protection required
Chemical-resistant goggles or face protection required	Protective clothing is required
Occupational safety and hygiene	Keep away from food, beverages and tobacco products. Wash hands after each contact with the substance. Use ointments to protect the skin of the hands. In case of contamination, remove all contaminated clothing immediately. In case of skin contact, wash contaminated skin immediately.

The maximum concentration of the hydrogen peroxide for consumer applications should not exceed 12%. Although the 12% hydrogen peroxide solution is not a skin irritant, protective gloves are recommended.

Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.

Sensors indicating a leak and automatically controlled valves should be installed to protect workers from accidental and uncontrolled release of a substance.
Periodic training of employees should include information on the risks of using the substance and when they are directly exposed to the substance, while also

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they should be trained in safe procedures in the event of an accidental and uncontrolled release of a substance.

2. Exposure estimation and references in the context of their source

Workers (swallow)	Good industrial practice eliminates potential for exposure through ingestion for workers	
Workers (dermal exposure)	Workers in contact with ≥35% hydrogen peroxide solution are required to wear proper eye and skin protection	
Workers (inhalation), RMMs Industrial PROC 1, none Industrial PROC 2, LEV 90% Industrial PROC 3, LEV 90% Industrial PROC 4, LEV 90% Industrial PROC 13, LEV 90% Professional PROC 1, none Professional PROC 2, LEV 80% Professional PROC 3, LEV 80% Professional PROC 4, LEV 80% Professional PROC 13, LEV 80% Professional PROC 19, LEV 80%	Estimated based on ECETOC TRA (max. concentrations) 0.005 mg/m ³ (35% w/w) 0.05 mg/m ³ (35% w/w) 0.149 mg/m ³ (35% w/w) 0.248 mg/m ³ (35% w/w) 0.496 mg/m ³ (35% w/w) 0.005 mg/m ³ (35% w/w) 0.496 mg/m ³ (35% w/w) 0.298 mg/m ³ (35% w/w) 0.992 mg/m ³ (35% w/w) 0.34 mg/m ³ (12% w/w) 0.85 mg/m ³ (12% w/w)	
Consumers (ingestion)	Not applicable	
Consumers (dermal exposure)	The maximum concentration of the hydrogen peroxide for consumer applications should not exceed 12%. Although the 12% hydrogen peroxide solution is not a skin irritant, protective gloves are recommended.	
Consumers (inhalation exposure)	0.13mg/m ³ .	
	Estimated using EUSES	
	Bleaching of pulp, decoloring	Bleaching (other applications)
Fresh water Sea water Soil Wastewater treatment plants People/environment	0.0098mg/l 0.001mg/l 1.54 x 10 ⁻⁴ mg/kg 0.098 mg/l not applicable	0.004mg/l 0.0004mg/l 1.28 x 10 ⁻⁴ mg/kg 0.042 mg/l not applicable

3. Guidance for downstream users to help determine if they are working within the limits of the Exposure Scenario defined herein

If there is a risk of exposure, the personal protection measures recommended above should be used. In addition to the use of technical control measures, i.e. adequate ventilation, the values of the maximum allowable concentrations should be monitored. If they are exceeded use additional personal protective equipment, e.g.: protective respirators, etc.

MATERIAL SAFETY DATA**Hydrogen peroxide 35% solution.**

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SN4

1.1 Title	Identified uses of hydrogen peroxide in environmental protection and agriculture
List of descriptors:	SU 1, 3, 8, 21, 22 ERC 4, 6b, 8a, 8b, 8d, 8e PC 0 (other: treatment of contaminated soils and groundwater) 20, 37 PROC 1, 2, 3, 4
Application sector [SU]:	SU 21 Consumer applications: households SU 22 Professional applications: public domain
Category of the chemical product (PC)	PC 0 (other: treatment of contaminated soils and groundwater) PC 20 Products from the groups of pH regulators, flocculants, precipitants, neutralizers PC 37 Water treatment chemicals
Process categories [PROC]:	PROC 1 Use in closed processes, no possibility of exposure PROC 2 Use in closed batch processes with sporadic, controlled exposure PROC 3 Use in closed batch processes (synthesis or formulation) PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises.
Environmental Release Category [ERC]:	ERC 4 Industrial use of excipients in processes and products that will not become part of an article ERC 6b: Industrial use of reactive excipients. ERC 8a: Widely dispersed use, indoors, of excipients in open systems ERC 8b: Widely dispersed use, indoors, of reactive excipients in open systems ERC 8d: Widely dispersed use, outdoors, of excipients in open systems ERC8e - Widely dispersed application, outdoors, reactive excipients in open systems
Other information	The scenario describes the processes and activities involved in the industrial use of hydrogen peroxide as an oxidizing agent to remove pollutants from industrial wastewater, flue gases or solid waste. The scenario also describes the professional use of hydrogen peroxide solutions in drinking water and wastewater and pool water treatment processes. In addition, the scenario covers the professional use of hydrogen peroxide removal processes in soils and groundwater and professional applications in agriculture, such as pipe cleaning in

MATERIAL SAFETY DATA

Hydrogen peroxide 35% solution.



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	greenhouses or milking facilities; as a source of oxygen in irrigation water or to increase oxygen supply to roots.												
1.1.1 Exposure Scenario 1													
1.1.1.1. Causal scenario controlling environmental exposure													
Name of the causal scenario	ERC 4 Industrial use of excipients in processes and products that will not become part of an article ERC 6b: Industrial use of reactive excipients. ERC8a: Widely dispersed use, indoors, of excipients in open systems ERC8b: Widely dispersed use, indoors, of reactive excipients in open systems ERC 8d: Use of widely dispersed, outdoors, of excipients in open systems ERC8e: Widely dispersed use, outdoors, of reactive excipients in open systems												
Other specifications	Not applicable												
Characteristics of the product	Liquid												
Volatility of the substance	Low												
Molecular weight (Molecular weight formerly called molecular weight)	34.02 ppm per mg/m3												
Percentage of substance in the product	30-90%												
Quantities used	Not applicable												
Frequency and duration uses/exposures	Duration of employee exposure: >4 hr daily Frequency of occupational exposure: 220 days/year for a single employee Frequency of on-site emissions: 15 days/a year.												
Environmental indicators not covered by risk control	Average flow in the receiving river : ≥18000 m3/day (default value)												
Other data operational conditions affecting environmental exposure: <ul style="list-style-type: none"> • Work indoors and outdoors. • Other data - operating conditions <table border="1" style="margin-left: 20px;"> <tr> <td>Quantities released, air</td> <td>0.01%</td> </tr> <tr> <td>Quantities released, sewage</td> <td>0.05%</td> </tr> <tr> <td>Quantities released, soil</td> <td>0.8%</td> </tr> <tr> <td>Quantity of discharged wastewater (fresh water water)</td> <td>2000 m3/day</td> </tr> <tr> <td>Coefficient of dilution (fresh water)</td> <td>10</td> </tr> <tr> <td>Coefficient of dilution (salt water)</td> <td>100</td> </tr> </table>		Quantities released, air	0.01%	Quantities released, sewage	0.05%	Quantities released, soil	0.8%	Quantity of discharged wastewater (fresh water water)	2000 m3/day	Coefficient of dilution (fresh water)	10	Coefficient of dilution (salt water)	100
Quantities released, air	0.01%												
Quantities released, sewage	0.05%												
Quantities released, soil	0.8%												
Quantity of discharged wastewater (fresh water water)	2000 m3/day												
Coefficient of dilution (fresh water)	10												
Coefficient of dilution (salt water)	100												
Technical conditions and measures at the level of	Not applicable												

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the process (source) to prevent the release of substances	
Local conditions and technical measures to reduce or limit the discharge of substances into surface waters, emissions into the air and release into the soil	Not applicable
Organizational measures to eliminate/reduce the release of the substance from the plant	Concentrated solutions should be properly diluted before use
Conditions and measures related to the municipal wastewater treatment plant	Acc. to EUSES, the concentration of hydrogen peroxide in untreated wastewater will be 8.23 mg/l (for the uses identified in this exposure scenario). No adsorption of the substance in sewage sludge. The maximum amount adsorbed (PECSTP) will be: 0.058mg/l. Capacity of the municipal sewage treatment plant: 2000 m3/day
Conditions and measures related to waste processing/recovery (waste) destined to be removed from the enterprise through an external company	No waste requiring special handling
Conditions and measures related to processing/recovery of waste for an external company	No waste requiring special handling
Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not have to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of REACH Regulation.	
If there is no access to a municipal wastewater treatment plant, then biological treatment of wastewater before it is discharged into the environment is recommended.	
1.1.2. Control of worker exposure: contributory scenario No. 1	
Name of the causal scenario	PROC 1 Use in closed processes, no possibility of exposure PROC 2 Use in closed batch processes with sporadic, controlled exposure PROC 3 Use in closed batch processes (synthesis or formulation) PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises.
Other specifications	Not applicable
Characteristics of the product	See above
Quantities used	Not applicable
Duration and frequency of use	Duration of employee exposure: >4 hr daily Exposure control in a workplace: 220 days/year for a single employee Frequency of on-site emissions: 15 days/a year.
Human factors beyond the influence of risk control	Exposure to concentrated hydrogen peroxide solutions in industrial wastewater treatment processes, municipal wastewater, drinking water or industrial water treatment processes is possible only in occasional cases. These processes are largely automated, and the

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	<p>peroxide solutions are dispensed automatically. This means that possible exposure will occur infrequently and last for a short period of time (e.g. during the control of process parameters, maintenance of devices). For consumer and institutional applications for product cleaning and maintenance, direct contact may occur once a day for a period of about 10 minutes, and workers may be in the process area for a period of 8 hours. Treatment processes for contaminated soils and groundwater are carried out continuously and are performed outdoors. Diluted peroxide solutions are pumped directly to the destination. Such a process can take up to several months. Exposure of workers to the substance can take place during maintenance work, control of process parameters, or filling storage tanks. The duration of exposure will not exceed 1 hour per day. Longer exposure may occur only when sampling treated environmental components. Conducting the cleanup of contaminated soils indoors will increase the time and frequency of exposure for workers.</p>
Other data operational conditions affecting employee exposure	Not applicable
Conditions and technical measures at the process (source) level to prevent release of substances	See: Human factors beyond the influence of risk control
Local conditions and technical measures to control the dispersion of substances from the sources towards the employee	Use of hydrogen peroxide should be done in a well-ventilated environment.
Organizational measures aimed at elimination/reduction of release, substance dispersion and exposure employees	<p>People in contact with hydrogen peroxide should be trained in the field of industrial safety and hygiene. During Unloading containers and barrels containing the hydrogen peroxide should be checked in terms of the tightness and cleanliness</p>
Conditions and measures related to personal protection, hygiene and health protection	
Technical protective measures	Local exhaust ventilation is required for vapor exposure
Respiratory track protection	In case of exposure to vapors or aerosols, use respiratory protection (e.g., gas mask with NO type absorber)
Hands protection	Required protective gloves (e.g., PVC, rubber)
Eye protection	Chemical-resistant goggles or face protection required
Protective goggles required or face protection resistant to	Protective clothing is required

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chemicals	
Occupational safety and hygiene	Keep away from food, beverages and tobacco products. Wash hands after each contact with the substance. Use ointments to protect the skin of the hands. In case of contamination, remove all contaminated clothing immediately. In case of skin contact, wash contaminated skin immediately.

The maximum concentration of the hydrogen peroxide for consumer applications should not exceed 12%.

Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.

Periodic training of employees should include information on the risks of using the substance and when they are directly exposed to the substance, at the same time they should be trained in safe procedures in case of accidental and uncontrolled release of a substance

2. Exposure estimation and references in the context of their source

Workers (swallow)	Application of good industrial practice eliminates the possibility of exposure by ingestion by employees
Workers (dermal exposure)	Workers in contact with $\geq 35\%$ hydrogen peroxide solution are required to wear proper eye and skin protection
Workers (inhalation), RMMs Industrial PROC 1, none Industrial application PROC 2, none Industry. application PROC 3, LEV 90% Industry. application PROC 4, LEV 90% Professional application PROC 1, non Professional application PROC 2, LEV 80% Professional application PROC 3, LEV 80% Professional application PROC 4, LEV 85%	Estimated based on ECETOC TRA (max. concentrations) 0.007 mg/m ³ (50% w/w) 0.708 mg/m ³ (50% w/w) 0.213 mg/m ³ (50% w/w) 0.354 mg/m ³ (50% w/w) 0.007 mg/m ³ (50% w/w) 0.708 mg/m ³ (50% w/w) 0.425 mg/m ³ (50% w/w) 1.06 mg/m ³ (50% w/w)
Outdoor use. Workers (inhalation), RMMs Industry application PROC 1, none Industry. application PROC 2, none Industry. application PROC 3, PRE 90% Industry. application PROC 4, PRE 90% Professional application PROC 1, non Professional application PROC 2, PRE 90% Professional application PROC 3, PRE 90% Professional application PROC 4, PRE 90%	Estimated based on ECETOC TRA (maximum concentrations) 0.007 mg/m ³ (50% w/w) 0.496 mg/m ³ (50% w/w) 0.149 mg/m ³ (50% w/w) 0.248 mg/m ³ (50% w/w) 0.007 mg/m ³ (50% w/w) 0.248 mg/m ³ (50% w/w) 0.149 mg/m ³ (50% w/w) 0.496 mg/m ³ (50% w/w)
Consumers	No exposure
.	Estimated using EUSES
Fresh water Sea water Soil Wastewater treatment plants People/environment	0.0085mg/l 7.75 x 10 ⁻⁴ mg/l 1.13 x 10 ⁻⁴ mg/kg 0.088 mg/l not applicable

3. Guidance for downstream users to help determine if they are working within the limits of the Exposure Scenario defined herein

If there is a risk of exposure, the personal protection measures recommended above should be used. In addition to the use of the technical control m, i.e. adequate ventilation

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values of the maximum permissible concentrations should be monitored. If they are exceeded, additional personal protective equipment should be used, e.g.: respirators, etc.

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SN5

1. 1 Title	Identified uses of hydrogen peroxide in cleaning products
List of descriptors:	SU 21, 22 ERC 8a, 8b, 8d, 8e PC 21, 35 PROC 4, 10, 11, 13, 19
Application sector [SU]:	SU 21 Consumer applications: households SU 22 Professional applications: public domain
Category of the chemical product (PC)	PC 21 Low-energy manipulation of bound substances in industrial materials and/or industrial products PC 35 Cleaning and laundry products
Process categories [PROC]:	PROC 4 Use in batch and other processes (synthesis) where the possibility of exposure arises. PROC 10 Brush or roller application PROC 11: Non-industrial spray application PROC 13 Treatment of industrial products by soaking or flooding PROC 19 Hand-mixing with close contact and only personal protective equipment available
Environmental Release Category [ERC]:	ERC 8a: Widely dispersed use, indoors, of excipients in open systems ERC 8b: Widely dispersed use, indoors, of reactive excipients in open systems ERC 8d: Widely dispersed use, outdoors, of excipients in open systems ERC8e - Widely dispersed application, outdoors, reactive excipients in open systems
Other information	The scenario describes use of hydrogen peroxide as an ingredient in cleaning agents by professional users and consumers. Hydrogen peroxide-based products can be used to clean surfaces, drains and sanitary facilities in both diluted and undiluted forms. Cleaners can be applied to surfaces by rubbing, spraying or brushing. Surfaces are often washed after using the cleaners or wiped down to dry
1.1.1 Exposure Scenario 1	
1.1.1.1. Contributing scenario controlling case environmental exposure: chemical manufacturing - ERC1	
Name of the causal scenario	ERC 8a: Widely dispersed use, indoors, of excipients in open systems ERC 8b: Widely dispersed application, in rooms, of reactive excipients in

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	open systems ERC 8d: Widely dispersed use, outdoors, of excipients in open systems ERC 8e: Widely distributed use, outdoors, of reactive substances in open systems						
Other specifications	Indoor/outdoor use; consumer and industrial applications; direct release to environment or sewerage system						
Characteristics of the product	Liquid						
Volatility of the substance	Low						
Molecular weight (Molecular weight formerly called molecular weight)	34.02 ppm per mg/m ³						
Percentage of substance in the product	30-90%						
Quantities used <ul style="list-style-type: none"> Professional applications Consumer applications Annual volume used regionally Annual amount used locally 	≤ 400 g ≤ 110 g 6210 t/year (all consumer uses) 1242 t/year (all consumer uses)						
Frequency and duration of use/exposure	The operating conditions, frequency, duration of exposure and amounts of use were determined based on exposure scenarios proposed by the International Association of Soap, Detergent and Sanitizer Manufacturers (AISE 2009). Professional applications: Frequency: 80 applications per day for the spray method; 8 applications for brushing Application period: 0, 1 minute for spray method; 60 minutes for brushing Consumer applications: Frequency: 1 application per day (surface cleaners and spray cleaners); 2 times per week (toilet cleaners). Application period: max. 20 minutes (surface cleaners); 10 minutes (spray cleaners); < 1 minute (toilet cleaners). Dose: 110g per application (surface cleaners); 30g (cleaners - spray); 50 g (toilet cleaners).						
Environmental indicators not covered by risk control	Average flow in the receiving river : ≥18000 m ³ /day (default value)						
Other data operational conditions affecting environmental exposure: <ul style="list-style-type: none"> Work indoors and outdoors. Other data - operating conditions 	<table border="1"> <tr> <td>Quantities released, air</td> <td>0%</td> </tr> <tr> <td>Quantities released, sewage</td> <td>0.8%</td> </tr> <tr> <td>Quantities released, soil</td> <td>0%</td> </tr> </table>	Quantities released, air	0%	Quantities released, sewage	0.8%	Quantities released, soil	0%
Quantities released, air	0%						
Quantities released, sewage	0.8%						
Quantities released, soil	0%						

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	Quantity of discharged wastewater (fresh water water)	2000 m3/day	
	Coefficient of dilution (fresh water)	10	
	Coefficient of dilution (salt water)	100	
Technical conditions and measures at the level of the process (source) to prevent the release of substances		Not applicable	
Local conditions and technical measures to reduce or limit the discharge of substances into surface waters, emissions into the air and release into the soil		Not applicable	
Organizational measures to eliminate/reduce the release of substances from the plant		A combination of organizational and technical measures (spill containment and early detection) should be implemented at the plant to eliminate or significantly reduce the release of the substance from the plant, or to quickly recognize that the substance is accidentally released.	
Conditions and measures related to the municipal wastewater treatment plant		A municipal wastewater treatment plant is assumed to be per 10,000 residents, where each generates 200 liters of wastewater per day, making 2,000,000 liters of total wastewater/day	
Conditions and measures related to the processing/recovery of waste to be disposed of from the enterprise through a third-party company		<p>Air Emissions may occur if carbon filters that reduce gas emissions are worn out.</p> <p>Sewage: Industrial wastewater must be neutralized with:</p> <ul style="list-style-type: none"> • Biological wastewater treatment plant, or • By the ozonation method <p>Dispose of the wastewater generated by the bleaching process (for both professional and consumer applications) into the public sewer system. There will be rapid decomposition of hydrogen peroxide.</p> <p>Solid and liquid wastes (industrial uses): Consider as industrial waste</p> <p>Solid and liquid waste (professional and consumer applications): Dispose of as municipal waste</p>	
Conditions and measures related to processing/recovery of waste for an external company			
Type of waste		Liquid and solid waste	
Removal techniques		Treat empty packaging as municipal waste	
Fractions likely to be released into the environment		Hydrogen peroxide is very reactive and will decompose when it comes into contact with other wastes. No	

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	emissions are expected
<p>Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure in reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.</p>	
Not applicable	
1.1.2. Control of worker exposure: contributory scenario No. 1	
Name of the causal scenario	PROC 4 Use in batch and other processes and other processes (Synthesis) during which the possibility of exposure arises PROC 10: Brush or roller application PROC 11: Non-industrial spray application PROC 13 Treatment of industrial products by soaking or flooding PROC 19 Hand-mixing with close contact with the substance and availability of personal protective equipment only
Other specifications	Not applicable
Characteristics of the product	See above
Quantities used	
Professional use - ≤ 400 g Consumer use - ≤ 110 g Annual amount used regionally - 6210 t/year (all consumer uses) Annual amount used locally - 1242 t/year (all consumer uses)	
Duration and frequency of use	
The operating conditions, frequency, duration of exposure and amounts of use were determined based on exposure scenarios proposed by the International Association of Soap, Detergent and Cleaning Product Manufacturers (AISE 2009). Professional applications: Frequency: 80 applications per day for the spray method; 8 applications for brushing Application period: 0.1 minutes for spray method; 60 minutes for brushing Consumer applications: Frequency: 1 application per day (surface cleaners and spray cleaners); 2 times per week (toilet cleaners). Application period: max. 20 minutes (surface cleaners); 10 minutes (spray cleaners); < 1 minute (toilet cleaners). Dose: 110g per application (surface cleaners); 30g (spray cleaners); 50g (toilet cleaners).	
Human factors beyond the influence of risk control	Employees/consumers may be exposed to effects of hydrogen peroxide through inhalation and dermal contact.
Other data operational conditions affecting employee exposure	Indoor/outdoor use
Technical conditions and measures at the level of the process (source) to prevent the release of substances	Not applicable
Local conditions and technical measures to control the dispersion of the substance from the source towards the worker	Cleaning is carried out under normal ambient conditions, i.e. temperature of about 20° C and ambient pressure. Rooms, where products are used, frequently are not well ventilated. In addition, the lack of local exhaust ventilation (AISE 2009). Use general ventilation of the room.
Organizational measures aimed at	People in contact with hydrogen peroxide

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elimination/reduction of release, substance dispersion and exposure employees	should be trained in terms of industrial safety and hygiene. During unloading containers and drums containing the hydrogen peroxide should be checked in terms of the tightness and cleanliness
Conditions and measures related to personal protection, hygiene and health protection	
Respiratory track protection	-
Hands protection	Required protective gloves (e.g., PVC, rubber)
Eye protection	Chemical-resistant goggles or face protection required
Skin protection	-
Safety Work hygiene:	Keep away from food, beverages and tobacco products. Wash hands after any contact with the substance. Use ointments to protect the skin of the hands. . in case of contamination, immediately remove all contaminated clothing In case of skin contact, wash contaminated skin immediately.
<p>The maximum concentration of the hydrogen peroxide for consumer applications should not exceed 12%.</p>	
Additional tips for good professional practice, outside the scope of chemical safety assessment in accordance with Regulation No. 1907/2006 (REACH). Note: The measures cited in this section need not be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.	
<p>Periodic training of employees should include information on the risks produced by use of the substance and when they are directly exposed to the substance, at the same time should be trained in safe procedures for accidental and uncontrolled release of a substance</p>	
2. Exposure estimation and references in the context of their source	
Workers (swallow)	Good industrial practice eliminates potential for exposure by ingestion for employees
Workers (dermal exposure)	People in contact with 12% hydrogen peroxide solution should use rubber protective gloves When using undiluted products use eye protection.
Workers (inhalation), RMMs Cleaning with sprays Cleaning by wiping, washing Use of WC cleaning agents Use of cleaning products containing H ₂ O ₂	Estimated based on ConsExpo (max. concentration) 0.002 mg/m ³ (7% w/w), acute exposure 1.07 mg/m ³ (7% w/w), acute exposure 1.16 mg/m ³ (12% w/w), acute exposure 1.07 (7% w/w), long-term exposure
Consumers	When used in accordance with the application exposure does not occur
Consumers (thermal exposure)	People in contact with 12% hydrogen peroxide solution should use rubber protective gloves and safety glasses.
.	Estimated using EUSES
Sweet water Sea water Soil Sewage treatment	0.0037mg/l 2.94 x 10 ⁻⁴ mg/l 1.11 x 10 ⁻⁴ mg/kg 0.0095mg/l

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People/environment	Not applicable
3. Guidance for downstream users to help determine if they are working within the limits of the Exposure Scenario defined herein	
If there is a risk of exposure, the personal protection measures recommended above should be used. In addition to the use of technical control measures, i.e. adequate ventilation, the values of the maximum allowable concentrations should be monitored. If they are exceeded use additional personal protective equipment, e.g.: protective respirators, etc.	

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SN6

1.1 Title	Identified uses of hydrogen peroxide in bleaching agents						
List of descriptors:	SU 21, 22 ERC 8b PC 39 PROC 19						
Application sector [SU]:	SU 21 Consumer applications: households SU 22 Professional applications: public domain						
Category of the chemical product (PC)	PC 39 Cosmetics, personal care products						
Process categories [PROC]:	PROC 19 Hand-mixing with close contact with the substance and availability of personal protective equipment only						
Environmental Release Category [ERC]:	ERC 8b: Widely dispersed application, in rooms, of reactive excipients in open systems						
Other information	The scenario describes the uses of hydrogen peroxide as a bleaching ingredient in mixtures used to lighten hair and whiten teeth. The scenario covers both professional as well as consumer applications.						
1.1.1 Exposure Scenario 1							
1.1.1.1. Causal scenario controlling environmental exposure							
Name of the causal scenario	ERC 8b: Widely dispersed application, in rooms, of reactive excipients in open systems						
Other specifications	Indoor/outdoor use; consumer applications and industrial; direct release into the environment or sewerage system						
Characteristics of the product	Liquid						
Volatility of the substance	Low						
Molecular weight (Molecular weight formerly called molecular weight)	34.02 ppm per mg/m ³						
Percentage of substance in the product	<30%						
Quantities used <ul style="list-style-type: none"> Professional applications Consumer applications Annual volume used regionally Annual amount used locally 	Small amounts Small amounts 6210 t/year (all consumer uses) 1242 t/year (all consumer uses)						
Frequency and duration of use/exposure							
Time of the exposure: Max. several hours for a single application Frequency of exposure Low Frequency of emission 365 days/year							
Environmental indicators not covered by risk control	Average flow in the receiving river : ≥18000 m ³ /day (default value)						
Other data operational conditions affecting environmental exposure: <ul style="list-style-type: none"> Work indoors and outdoors. Other data - operating conditions <table border="1" data-bbox="443 1821 1007 1975"> <tr> <td>Quantities released, air</td> <td>0%</td> </tr> <tr> <td>Quantities released, sewage</td> <td>0.8%</td> </tr> <tr> <td>Quantities released,</td> <td>0%</td> </tr> </table>		Quantities released, air	0%	Quantities released, sewage	0.8%	Quantities released,	0%
Quantities released, air	0%						
Quantities released, sewage	0.8%						
Quantities released,	0%						

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	soil		
	Quantity of discharged wastewater (fresh water water)	2000 m3/day	
	Coefficient of dilution (fresh water)	10	
	Coefficient of dilution (salt water)	100	
Technical conditions and measures at the level of the process (source) to prevent the release of substances		Not applicable	
Local conditions and technical measures to reduce or limit the discharge of substances into surface waters, emissions into the air and release into the soil		Not applicable	
Organizational measures to eliminate/reduce the release of substances from the plant		A combination of organizational and technical measures (spill containment and early detection) should be implemented at the plant to eliminate or significantly reduce the release of the substance from the plant, or to quickly recognize that the substance is in the accidentally released.	
Conditions and measures related to urban sewage treatment		Acc. to EUSESh, hydrogen peroxide concentration in untreated wastewater will be 1, 36 mg/l (for uses identified in this exposure scenario). Estimated value of PECSTP will be: 0.0095 mg/l. Capacity of municipal wastewater treatment 2000 m3/dziennie.	
Conditions and measures related to the processing/recovery of waste to be disposed of from the enterprise through a third-party company		Air No emissions Sewage: The remaining wastewater should be treated as municipal wastewater and discharged to a municipal wastewater treatment plant Solid and liquid waste (professional and consumer applications): Treat as municipal waste	
Conditions and measures related to processing/recovery of waste for an external company			
Type of waste		Liquid and solid waste	
Removal techniques		Treat empty packaging as municipal waste	
Fractions likely to be released into the environment		Hydrogen peroxide is very reactive and will decompose when it comes into contact with other wastes. No emissions are expected	
Additional guidance on good occupational practice, outside the scope of the chemical safety assessment according to Regulation No. 1907/2006 (REACH). Note: The measures cited in this section do not need to be taken into account when estimating exposure in reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.			
Not applicable			

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1.1.2. Control of worker exposure: contributory scenario No. 1	
Name of the causal scenario	PROC 19 Manual mixing with close contact with substance and the availability of protective measures only
Other specifications	Not applicable
Characteristics of the product	See above
Quantities used	
Professional use Small quantities Consumer use Small quantities Annual amount used regionally - 6210 t/year (all consumer uses) Annual amount used locally - 1242 t/year (all consumer uses)	
Duration and frequency of use	
Time of the exposure: Several hours for a single application Frequency of exposure Low Frequency of emission 365 days/year	
Human factors beyond influence of risk control	Employees/consumers may be exposed to effect of hydrogen peroxide through the respiratory tract and skin contact.
Other given operating conditions affecting employee exposure	Indoor/outdoor use
Technical conditions and measures at the level of process (source) aimed at preventing of release of the substance	Not applicable
Local conditions and technical measures intended to control the dispersion of substances from sources towards the employee	Use general ventilation of the room.
Organizational measures aimed at elimination/reduction of release, substance dispersion and exposure employees	Not applicable
Conditions and measures related to personal protection, hygiene and health protection	
Respiratory track protection	-
Hands protection	Required protective gloves (e.g., PVC, rubber)
Eye protection	Chemical-resistant goggles or face protection required
Skin protection	-
Safety Work hygiene:	Keep away from food, beverages and tobacco products. Wash hands after any contact with the substance. Use ointments to protect the skin of the hands. . in case of contamination, immediately remove all contaminated clothing In case of skin contact, wash contaminated skin immediately.
The maximum concentration of the hydrogen peroxide for consumer applications should not exceed 12%.	
<p>Additional tips for good professional practice , outside the scope of chemical safety assessment in accordance with Regulation No. 1907/2006 (REACH). Note: The measures cited in this section need not be taken into account when estimating exposure with reference to the above exposure scenario. They are not mandatory according to Article 37 (4) of the REACH Regulation.</p>	
Periodic training of employees should include information on the risks produced by use of the substance and when they are directly exposed to the substance, at the same time should be trained in safe procedures for accidental and	

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uncontrolled release of a substance	
2. Exposure estimation and references in the context of their source	
Employees	Not applicable
Consumers	Not applicable
Environment	Estimated using EUSES
Fresh water	0.0037mg/l
Sea water Soil	2.94 x 10 ⁻⁴ mg/l
Wastewater treatment plants	1.11 x 10 ⁻⁴ mg/kg
People/environment	0,0095 mg/l
	Not applicable
3. Guidance for downstream users to help determine if they are working within the limits of the Exposure Scenario defined herein	
Not applicable	