



**APPLICATION FOR AN ENVIRONMENTAL PERMIT
VARIATION UNDER THE ENVIRONMENTAL
PERMITTING (ENGLAND AND WALES) REGULATIONS
2016 (AS AMENDED)**

**ENVIRONMENTAL PERMITTING TECHNICAL
REQUIREMENTS DOCUMENT**



PB LEINER

The Clear Solution

**P B GELATINS U.K. LIMITED,
UNIT A6, SEVERN ROAD,
TREForest INDUSTRIAL ESTATE,
PONTYPRIDD, CF37 5SQ**

**ECL Ref: PBGE.01.09/EPTR
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ACRONYMS/TERMS USED IN THE TEXT

AELs	Associated Emission Levels
AMP	Accident Management Plan
AWT	Air Water Treatment
BAT	Best Available Techniques
BOD	Biological Oxygen Demand
LDAR	Leak Detection and Repair
BRef	Best Available Techniques Reference Document
CCA	Climate Change Agreement
CIP	Clean In Place
CMS	Chemicals Management System
CO₂	Carbon Dioxide
COD	Chemical Oxygen Demand
DAA	Directly Associated Activities
DAF	Dissolved Air Flotation
DCWW	Dwr Cymru Welsh Water
ECL	Environmental Compliance Limited
EMS	Environmental Management System
EP Regulations	Environmental Permitting (England and Wales) Regulations 2016 as amended
EP	Environmental Permit
EPRP	Emergency Preparedness and Response Plan
EPTR	Environmental Permitting Technical Requirements
EQS	Environmental Quality Standards
ERA	Environmental Risk Assessment
FDF	Food and Drink Federation
IBC	Intermediate Bulk Container
IED	Industrial Emissions Directive
mmH₂O	Millimetres of Water Column
MSDS	Material Safety Data Sheets
NH₃	Ammonia
NRW	Natural Resources Wales
OMP	Odour Management Plan

ACRONYMS/TERMS USED IN THE TEXT

OTNOC	Other Than Normal Operating Conditions
PB Gelatins	P B Gelatins U.K. Limited
PPMR	Planned Preventative Maintenance Regime
QMS	Quality Management System
SCR	Site Condition Report
SuDS	Sustainable Drainage Systems
The Installation	PB Gelatins Treforest Gelatin Manufacturing Site
TOC	Total Organic Carbon

1. INTRODUCTION

1.1. Overview

1.1.1. Environmental Compliance Limited (“ECL”) have been commissioned by P B Gelatins UK Limited (“PB Gelatins”) to prepare an Environmental Permit (“EP”) (EPR/DP3030ZC) variation application in relation to their gelatin manufacturing site, hereafter referred to as “the Installation”, located at Unit A6, Severn Road, Treforest Industrial Estate, Pontypridd, CF37 5SQ.

1.1.2. The Permit variation application proposes the following:

- new effluent treatment plant associated with building A21 operations, altered site drainage and one additional point source emission to sewer designated DP2;
- expansion of the Environmental Permit boundary for the inclusion of additional storage areas within Buildings A12 and A13;
- installation of two new biofilters – one to service the ‘A18 New and Millennium Farm’ Buildings and a second unit for the A18 ‘Old Farm’ building;
- incorporation of ten additional point source emissions to air designated EP20-EP29;
- installation of a new bunded 15m³ hydrogen peroxide tank and a 30m³ salt saturator (brine) vessel adjacent to the A21 building.

1.2. Installation Location

1.2.1. The Installation is located at Unit A6, Severn Road, Treforest Industrial Estate, Pontypridd, Rhondda Cynon Taff, CF37 5SQ. The Installation covers an area of approximately 3.85 hectares comprising several discrete areas of land within the northern area of Treforest Industrial Estate.

1.2.2. PB Gelatins is proposing to expand the EP boundary to include additional areas of land (Building A12 and A13). The proposed EP boundary is shown on the Site Layout Plan (Drawing Reference PBGE.01.09-01) contained in Section 3 of this application submission.

1.3. The Applicant

1.3.1. PB Gelatins extract high purity gelatine from ossein for use in a range of applications including the food and pharmaceutical industries.

1.3.2. PB Gelatins UK Limited were incorporated in 1980 under company number 01477674. PB Gelatins operate under the PB Leiner brand name, part of the Tessenderlo Group, a diversified industrial group focusing on agriculture, valorising bio-residuals, energy and the provision of industrial solutions.

1.4. Pre-Application Advice

- 1.4.1. PB Gelatins held a pre-application advice meeting with Dale Padfield (Site Inspector and Senior Officer – Industry Regulation Team) and Geraint Harris (Senior Officer – Industry Regulation Team) of Natural Resources Wales (“NRW) on the 16th December 2022.
- 1.4.2. The proposals related to the new effluent treatment and drainage arrangements were discussed, as well as the associated permitting considerations.
- 1.4.3. A follow up email from NRW on the 9th January 2023 confirmed the appropriate Best Available Technique Conclusions and regulatory guidance documents which should be considered as part of the variation application. This is discussed in further detail in Section 4 and 10 of this EPTR.

2. LISTED ACTIVITIES

2.1. Current Activities

2.1.1. The Installation is currently subject to two Schedule 1 Activities under the Environmental Permitting (England and Wales) Regulations 2016 as amended (“EP Regulations”) as detailed in Table 1 below.

Table 1: Permitted Schedule 1 Activities

Schedule 1 Activity	Description of Specified Activity	Limits of Specified Activity
Section 6.8 Part A1 (c)	Disposing of or recycling animal carcasses or animal waste, at a plant with a treatment capacity exceeding 10 tonnes per day of animal carcasses or animal waste or both in aggregate.	From receipt of ossein and other raw materials to the extraction and storage of gelatin.
Section 5.4 Part A1 (a) (ii)	Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by physico-chemical treatment.	From collection of process effluent to discharge to sewer, including the Dissolved Air Flotation (“DAF”) plant.

2.1.2. The Directly Associated Activities (“DAA”) currently permitted are detailed in Table 2.

Table 2: Directly Associated Activities

DAA	Description of DAA	Limits of Specified Activity
Storage of waste	Storage and handling of by-products and wastes generated by the process	From receipt of by-products and wastes from the process to dispatch from site.
Finished product storage	Storage of finished products	From receipt of finished products to dispatch of finished products.
Raw materials storage	Raw materials storage and handling	From receipt of raw materials to transfer to the manufacturing process.
Chemical storage	Chemical storage and handling	From receipt of materials to their use on-site or disposal off-site.

2.2. Proposed Activities

2.2.1. There will be no change to the Schedule 1 Activities or the DAAs as a result of this variation application.

2.2.2. To ensure that the EP application documents which form part of the Environmental Permit remain reflective of the site operations, this EPTR document details the proposed changes to be made at the Installation.

2.2.3. The permit variation application covers the following:

- installation of a new effluent treatment system to capture and treat A21 process wastewater. Drainage lines will be made redundant to isolate the drainage connection from A21 and the existing effluent treatment system. The new effluent treatment infrastructure proposals involves one new point source emission to foul sewer to connect into the Dwr Cymru Welsh Water (“DCWW”) foul sewer drainage line and one new point source emission to air from the wet scrubber unit servicing the proposed effluent balancing tank;
- expansion of the existing Permit boundary to incorporate additional storage areas in Building A12 and A13 for storage of packaging, ‘work in progress’ material/intermediate product prior to blending, as well as storage of finished product prior to dispatch from the Installation;
- installation of two biofilters and two new associated point source emissions to air - one biofilter unit will service the A18 ‘New Farm’ and ‘Millennium Farm’ Buildings and a second unit for the A18 ‘Old Farm’ building. The purpose of the biofilters is to reduce potential fugitive odour emissions from the blowing of the liming pits;
- installation of two gas space heaters in the A18 ‘New Farm’ and ‘Millennium Farm’ buildings for ambient heating of the buildings to ensure the contents within the liming pits remain at 14°C. This involves two new point source emissions to air;
- capture of existing point source emission points to air which are not currently listed in the Environmental Permit, including:
 - A21 extraction residue tank exhaust,
 - liming facility hot water boiler exhaust,
 - DAF sludge tank odour control system exhaust,
 - A18 balance tank odour control system exhaust,
 - effluent pumping station sludge tank odour control system exhaust, and
- addition of two new raw material storage vessels; 15m³ hydrogen peroxide tank and 30m³ salt saturator vessel adjacent to the A21 building.

2.2.4. Detailed descriptions of all changes proposed are provided in Section 4 of this document.

3. MANAGEMENT TECHNIQUES

3.1. Overview of the Environmental Management System

- 3.1.1. PB Gelatins operate their own in-house Environmental Management System (“EMS”) which has been developed in accordance with the Environment Agency’s online guidance ‘*Develop a management system: environmental permits*’¹ (adopted by NRW).
- 3.1.2. The Plant Manager has overall responsibility for environmental matters at the Installation.
- 3.1.3. PB Gelatins has established a documented management system which:
- ensures compliance with the Environmental Permit and other licences and consents held by PB Gelatins;
 - identifies, assesses and minimises the risks of pollution arising from the Installation’s activities;
 - comprises a range of written procedures that cover all aspects of the Installation’s activities;
 - identifies, sets, monitors, and reviews environmental objectives and key performance indicators; and
 - includes a requirement to report annually on environmental performance, objectives, targets and future planned improvements.

3.2. Plan

- 3.2.1. The planning element of the management system includes:
- identification of environmental impacts and aspects associated with the Installation’s activities, and assessing their significance; including an assessment of the potential environmental risks including those posed by the work of contractors;
 - identification and evaluation of relevant legal and other relevant requirements including Permit requirements and Consent limits;
 - identification of environmental objectives and targets that will be focussed on reducing the impact of the identified significant environmental aspects, in conjunction with financial planning and investment;
 - a series of risk assessments to cover a range of issues, including site operations, maintenance, accidents, training and records; and
 - details of how PB Gelatins ensure that any relevant standards, guidance and codes of practice are met on an ongoing basis.
- 3.2.2. The outcomes of the above are:
- a comprehensive understanding of the potential and actual impacts of the permitted activities on the surrounding environment and people’s health;
 - the correct appropriate measures selected to manage environmental risks and prevent or minimise their effects so as not to cause pollution;
 - a series of documented procedures covering all aspects of the Installation’s

¹ <https://www.gov.uk/guidance/develop-a-management-system-environmental-permits> , accessed November 2023

activities; and

- a series of documented environmental objectives and targets, together with an action plan/development programme to ensure that these are met.

3.3. Implementation and Operation (Do)

3.3.1. This element includes:

- ensuring that management system roles and responsibilities are clearly defined and documented, and that site staff are made aware of these;
- ensuring that the Installation is operated by suitably competent staff who have received the necessary training in all aspects of the plant's operation, including where contractors are used, ensuring that they are suitably competent; in this regard:
 - the skills and competencies necessary for key posts are documented; these key posts include contractors, those responsible for liaising with contractors and those purchasing equipment and materials,
 - training requirements are identified by means of a documented training needs analysis,
 - documented training records are kept and updated as required,
 - training specifically addresses environmental awareness and environmental permit requirements, and
 - the requirement for ongoing/refresher training is identified;
- ensuring that there are site layout plans - including drainage plans - and that they are revised as required to reflect any changes at the Installation;
- ensuring that there are documented procedures covering internal and external communications;
- ensuring that there are procedures in place for staff and contractors to have access to the Installation's Permit and management system requirements; with regard to contractors, ensuring that suitable instructions are provided with regard to protecting the environment whilst working on site;
- the establishment of a documented planned preventative maintenance regime ("PPMR") to ensure that all plant and site infrastructure are kept in suitable condition and operating effectively; this PPMR details what maintenance, tests and inspections need to be completed and when; this also details the measures required to ensure continuing compliance with the permit conditions during maintenance/shutdown. The PPMR also:
 - identifies known or predictable malfunctions associated with the operations and the procedures, spare parts, tools and expertise required to deal with them,
 - includes a record of spare parts held, or details on where they can be sourced from, together with an assessment of how long they would take to obtain,
 - includes a defined procedure for identifying, reviewing and prioritising items of plant for which a preventative regime is appropriate,

- includes all “Critical Equipment List” i.e. equipment or plant whose failure could directly or indirectly lead to an impact on the environment or human health and ‘non-productive’ items,
 - ensure the necessary spare parts, tools, and competent staff are available prior to commencing maintenance;
- ensuring that there are documented procedures covering document control;
- ensuring that there are suitable documented record-keeping arrangements in place;
- ensuring that there are documented operational procedures and work instructions covering all aspects of the Installation’s operation;
- ensuring that there are documented procedures covering emissions monitoring undertaken at the Installation; these will specifically include details of the relevant standards/methods used, the equipment used, its maintenance and calibration requirements and the frequency required (i.e. continuous or periodic, and if periodic, the associated schedules);
- ensuring that there are documented procedures that incorporate environmental issues into the control of process/equipment/engineering change, capital approval and purchasing policy;
- ensuring that there are documented procedures to address non-conformities/non-compliances and the associated corrective and preventative action; these will detail the means by which any such non-conformities/non-compliances are reported to management and the means by which they are reported to NRW;
- ensuring that there is a documented procedure for dealing with complaints; this includes requirements to ensure that:
 - an appropriate person deals with the complaint,
 - the complaint is properly recorded,
 - the complaint is properly investigated,
 - any action necessary to deal with the cause of the complaint is recorded,
 - the impact of the activity causing the problem is minimised,
 - steps are taken to ensure that the problem is not repeated,
 - details of any justified complaints are reported to senior management,
 - that the complainant (or NRW, as appropriate) is responded to in writing,
 - if the complaint came via NRW, a suitable documented response is provided to NRW,
 - if the complaint has come from a neighbour or a member of the public, a suitable documented response is provided to the complainant, and, if the complaint is substantiated, a report is provided to NRW, and
 - the management system is amended accordingly to reflect any changes;
- ensuring that there are documented procedures covering emergency preparedness and response; these will cover such incidents as major plant failures, significant spillages of potentially polluting substances, loss of mains electrical power etc.; these are incorporated into an Accident Management Plan (“AMP”); PB Gelatins ensure that suitable measures are in place to communicate the AMP to all relevant employees, management and contractors who work at the site; the AMP details:

- the arrangements for response to an emergency, including defining specific responsibilities,
 - the measures for dealing with the consequences of an incident,
 - communicating with NRW and other relevant regulatory bodies,
 - communicating with the Installation's neighbours and the local community,
 - the measures for investigating incidents (and near-misses), including identifying suitable corrective action and following up implementation of that action,
 - the measures for recording incidents (and near-misses),
 - the measures for reporting incidents (and near misses) to Senior Management, and
 - the measures for reporting incidents to NRW;
- ensuring that there are documented procedures for carrying out internal audits; these describe how to schedule, conduct, report and manage internal audits;
 - ensuring that there is a documented contingency plan in place that ensures compliance is maintained with all Permit conditions and operating procedures during maintenance/shutdown at the Installation or elsewhere.

3.3.2. The outcome of the above is evidence that day-to-day activities are taking place in accordance with the requirements of the management system and the Installation's Permit, specifically:

- that control measures and procedures are an integral part of the business operation;
- that the management system is easy for staff to access, understand and use;
- that staff are suitably trained and competent to carry out procedures and control measures; and
- that the requirements of the management system are effectively communicated to management, staff and contractors.

3.4. Check

3.4.1. This element includes:

- ensuring that all regulatory requirements in relation to monitoring and measurement are complied with, specifically:
 - the requirements relating to inspection and testing required under the applicable environmental legislation and the Installation's Environmental Permit and the associated procedures and work instructions,
 - the requirements relating to inspection and testing required under the applicable health and safety legislation and the associated procedures and work instructions, and
 - the requirements relating to the control of all inspection, measuring and test equipment relating to environmental requirements;
- ongoing evaluation of compliance with environmental legal requirements, policy requirements and objectives and targets; this will include:

- an annual review of environmental legal register,
- regular plant inspections, and
- internal audit procedures (as detailed below);
- ensuring that non-conformities/non-compliances are properly recorded, investigated and that the appropriate corrective action is taken by the due date;
- ensuring that the necessary reporting and record-keeping required under the various Permit and consents are complied with;
- ensuring that internal audits are carried out in accordance with the documented procedures and that any audit actions are followed up; and
- ensuring that the results of all audits (internal and external) are made available to Senior Management on a regular basis.

3.4.2. The outcomes of the above will be:

- that checks are carried out to ensure that the management system is being implemented as intended, i.e. as documented; and
- the necessary preventative and corrective actions are undertaken to minimise non-compliances.

3.5. Review (Act)

3.5.1. This element includes:

- an annual management review of the management system to ensure that it is appropriate, being implemented and kept up to date, e.g. that any supplementary plans have been included into the management system;
- A management review of the management system when:
 - there are changes on site (in activities and/or plant/equipment),
 - if there is an accident, complaint, or breach of permit conditions.
- an annual review of both individual and organisational training needs;
- ensuring that all changes are properly recorded, and, if there are any major changes, NRW is informed;
- an assessment of whether the Installation's objectives, and any targets, have been met and reported;
- a review of the Installation's objectives and targets, and, where appropriate, any revisions to these so as to effect continual improvement.

3.5.2. The outcomes of the above will be:

- the management system is kept up to date, and
- the management system is continually improved.

3.6. EMS Amendments Taking Account of the Variation Proposals

3.6.1. The EMS will be reviewed to take account of the variation to ensure that it remains appropriate and effective. The principle anticipated changes are described below:

- update to the EMS documents to take account of any additional Environmental Permit Conditions and new Trade Effluent Consent limits;
- the Environmental Risk Assessment (“ERA”) (PBGE.01.09/ERA) will be used to inform the new risks and opportunities at the Installation;
- the environmental objectives and targets will take account of the proposed changes to ensure they remain appropriate, achievable but challenging;
- operational procedures will be reviewed to ensure they are aligned with the proposed changes detailed as part of the variation, for example, a new A21 effluent treatment operational procedure will be prepared, as well as waste handling and transfer procedures to detail how waste from the new proposed effluent treatment process will be dealt with;
- the documented PPMR will be updated to include maintenance and inspection related to the new plant and equipment;
- emergency plans and procedures will be updated to take account of any additional risks including the risk-based OTNOC management plan;
- employees will be trained in the updated EMS and associated operational procedures, such as all relevant employees will be suitably trained in the new effluent treatment system by the Engineering Department. Roles will be assigned and training given with each relevant employee. Records will be held to show training has been completed and understood. Refresher training will be provided annually; and
- all changes to the EMS will be documented and communicated to all employees.

4. OPERATING TECHNIQUES

4.1. Technical Standards

4.1.1. **European Legislation** – The following European Legislation will be used to inform the variation application:

- the Industrial Emissions Directive (“IED”) is intended to be a single legislative instrument to control pollution to air, water and land and set challenging industry standards. The established environmental principles and EU environmental law continues to have effect in UK law, therefore, the requirements of IED will therefore be considered relevant at this time; and
- the Best Available Techniques (“BAT”) Reference Document (“BRef”) for Waste Treatment (October 2018) will be considered as appropriate for the effluent treatment proposals; and
- the Slaughterhouses and Animal By-products (May 2005) BRef and the revised Final Draft of this BRef (March 2023) will be considered for future proofing of the proposals submitted as part of this variation application.

4.1.2. **National Legislation** – NRW implement the requirements of the IED via the EP Regulations and have provided guidance documents to assist in the preparation of Environmental Permit applications and the ongoing management of permitted Installations. NRW’s *‘How to comply with your environmental permit’* (Version 8, October 2014) has been considered as part of this variation application.

4.2. Current Activities

Effluent Treatment and Drainage Arrangements

4.2.1. Approximately 2,400m³ per day of effluent is currently generated by the activities undertaken at the Installation. Effluent is collected by a series of drains across all areas of the Installation and transferred to the effluent pumping station. This includes effluent from the A21 processing activities which is conveyed by gravity, travelling across the industrial estate for effluent treatment.

4.2.2. From the collection sump, the effluent is screened to a balance tank where particles of ossein waste are collected in a skip for collection and disposal off-site at an appropriately licenced facility or Installation.

4.2.3. The effluent collected in the balance tank is pumped to a DAF unit where the pH is neutralised via the addition of sulphuric acid. An organic flocculent and polymer coagulant are added for binding purposes. The bound particles are separated from the aqueous phase as a sludge by the addition of air bubbles to the DAF unit. The sludge is pumped to a collection tank for tanker collection and disposal off-site.

4.2.4. The aqueous phase from the DAF unit overflows into the effluent drain which is discharged to sewer under a Trade Effluent Consent (Consent Reference: TE 372). A copy of the consent is provided in Appendix I of this EPTR.

- 4.2.5. The Environmental Permit details one emission point to sewer at the Installation designated as DP1. The location of DP1 is shown on the Site Layout Plan (PBGE.01.09-01) submitted in Section 3 of this application.
- 4.2.6. The location of the existing effluent treatment system and the drainage lines which conveyed the A21 effluent across the Industrial Estate are shown on the Drainage Arrangements Plan (PBGE.01.09-02) also contained in Section 3 of this application.

Storage Arrangements

- 4.2.7. Finished product and work in progress/intermediate product is currently stored in the blending plant, A21 and A12 Buildings.

A18 Building Liming Pits – Space Heaters and Biofilters

- 4.2.8. The liming pits are currently kept at ambient temperature, however, during cooler months, the areas are not heated. The blowing of the liming pits does not currently benefit from an odour abatement system.

Emission Points to Air

- 4.2.9. The Environmental Permit also details sixteen point source emissions to air designated as EP4-EP19. The locations of EP4-EP19 are shown on the Site Layout Plan (PBGE.01.09-01) submitted in Section 3 of this application.

Raw Material Vessels

- 4.2.10. Salt is used for the water softeners and the previous system involved salt stored in 25kg bags.

4.3. Proposed Activities

Effluent Treatment and Drainage Arrangements

- 4.3.1. The existing effluent treatment system is proposed to remain in place with no proposed changes to the operational stages or discharge point. However, it is proposed that the existing effluent treatment system will only serve A18 'Old Farm' and 'New Farm' areas of the Installation.
- 4.3.2. In June 2022, a blockage occurred in one of the manhole chambers which caused the effluent system to backfill and effluent surcharged from a weakness in the system adjacent to a storm drain which resulted in wastewater entering the River Taff. Following assessment of the continued suitability of the effluent subsurface drainage system as required by CAR_NRW0040197, PB Gelatins are proposing the installation of new effluent treatment infrastructure for the wastewater generated from the A21 process building to eliminate the risk of a similar situation arising in the future.
- 4.3.3. The new effluent treatment system is proposed to be installed adjacent to building A21 as this new system will solely serve and treat A21 wastewater. The purpose of the new system is to remove solids from the A21 process wastewater and correct the pH prior to discharge directly to foul sewer.
- 4.3.4. Wastewater characterisation from A21 processing activities has been undertaken as part of the design phase to ensure that the proposed effluent treatment is appropriate and fit for purpose.
- 4.3.5. The proposed effluent treatment will avoid the high pH variability A21 process effluent from travelling via, and corroding, the wider existing effluent treatment system. The low pH of the effluent can lead to corrosion of the drainage pipework and pumps, therefore, this proposal is an improvement compared to the existing effluent treatment and drainage network currently at the Installation.
- 4.3.6. It is proposed that the A21 effluent will be held within a bunded subsurface stainless-steel tank of 30m³ capacity. The new tank will benefit from a level meter. The effluent will then be pumped by two stainless steel pumps from the collection to the screening system (two 0.5mm screening system) with the addition of cold water. The pH will be monitored prior to screening, in addition to flow.
- 4.3.7. The solids generated via the screening process will be collected within a roll on roll off stainless-steel skip under a roofed structure and the liquid phase will be pumped (duty and standby pumps per screen) to a new bunded settling tank for balancing (natural pH correction).
- 4.3.8. A new bunded settling/balancing tank of approximately 400m³ capacity will be installed. The bund capacity will be 447m³, therefore, providing in excess of 110% of the total contents of the tank.

- 4.3.9. The effluent will be held in the new bunded balancing tank, which has an effluent storage retention time of approximately 8 hours, and benefits from an aeration system, before being pumped using above ground centrifugal pumps through an in-line static mixer for pH correction. The pumps and static mixer will be located within a kerbed concrete area connected to the pumping station.
- 4.3.10. The effluent balance tank will benefit from an acid wet scrubber to remove any potential odours.
- 4.3.11. Effluent pH will be corrected with acid and alkaline dosing using sodium hydroxide, which will be stored in an existing bunded 10m³ storage tank, and hydrogen chloride, which will be stored in a new bunded Intermediate Bulk Container (“IBC”). A pH sensor will monitor the pH during correction and a flow meter and flow control will also be installed.
- 4.3.12. Once the effluent within the static mixer is of the correct pH for discharge to foul sewer (pH 5-11) in accordance with the Trade Effluent Consent, the effluent will be discharged via the proposed new discharge point DP2. The proposed emission point is shown the Site Layout Plan (PBGE.01.09-01) and Drainage Arrangements Plan (PBGE.01.09-02) contained in Section 3 of this submission. A flow meter will be installed immediately prior to the discharge point to ensure discharge quantities anticipated to be in the region of 1,500m³ per day or 100m³ per hour are also in accordance with the Trade Effluent Consent.
- 4.3.13. Figure 1 below illustrates the indicative layout of the proposed new effluent treatment system and the process flow is provided in Figure 2.

Figure 1: Proposed A21 Effluent Plant Layout

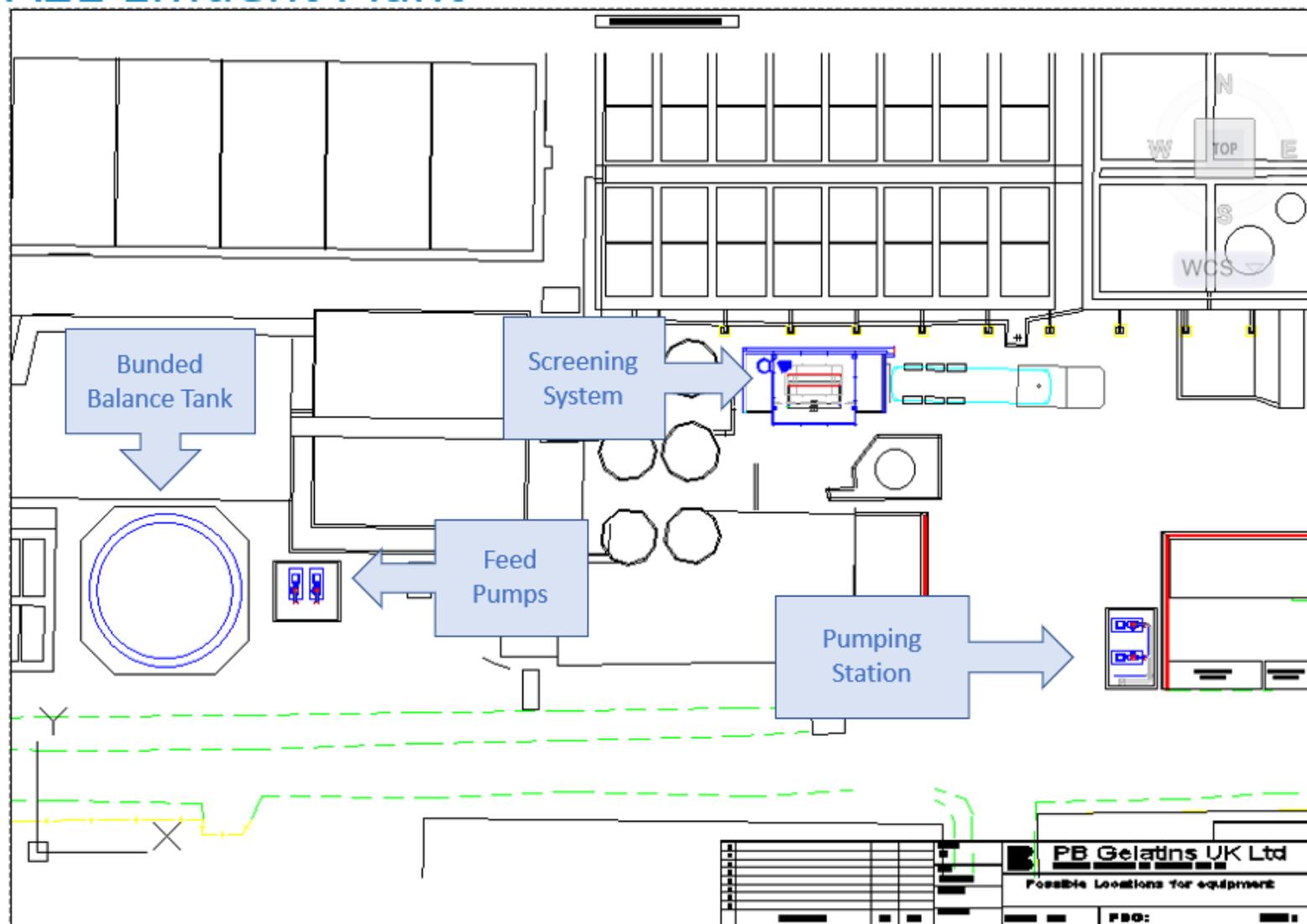
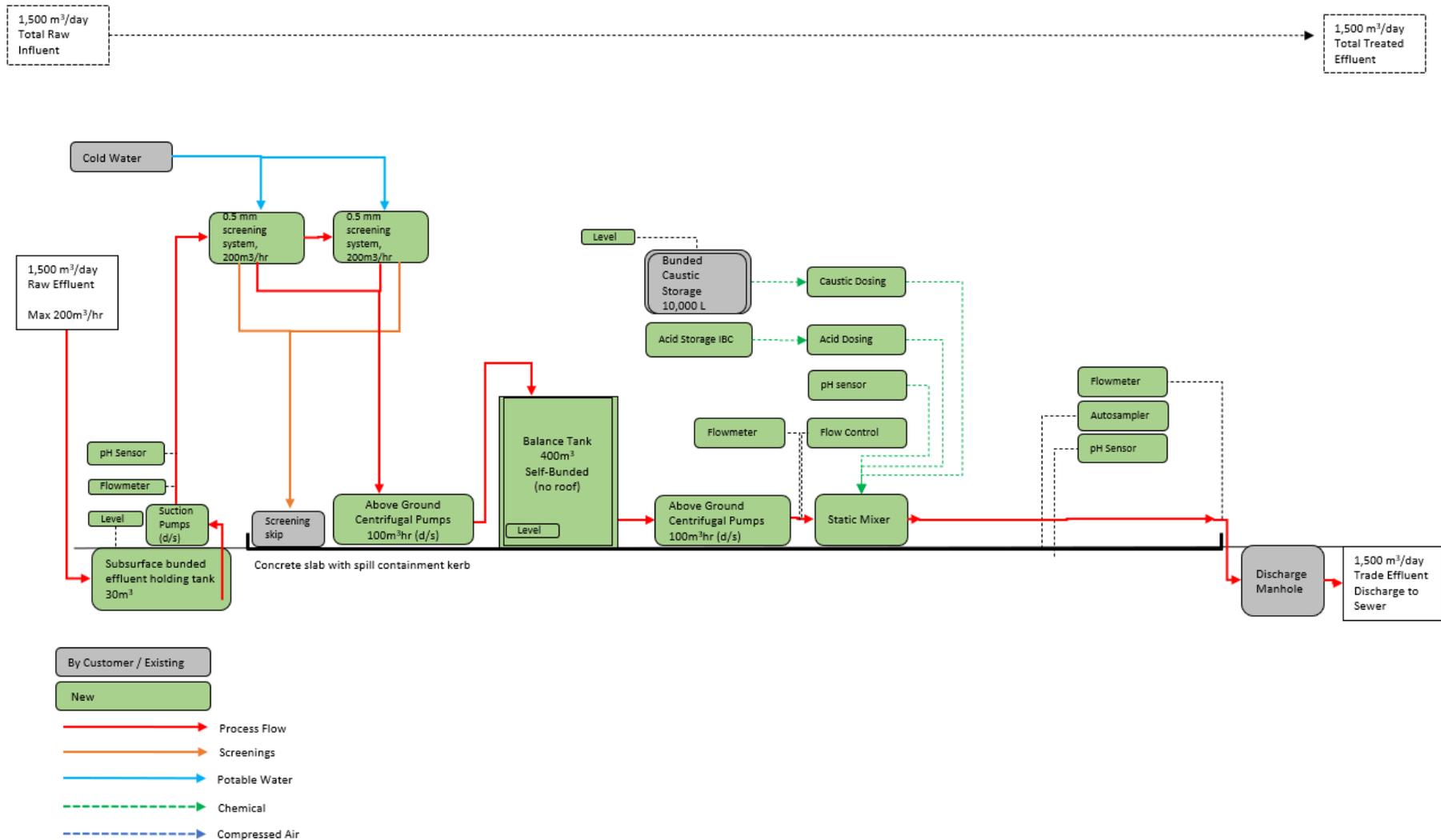
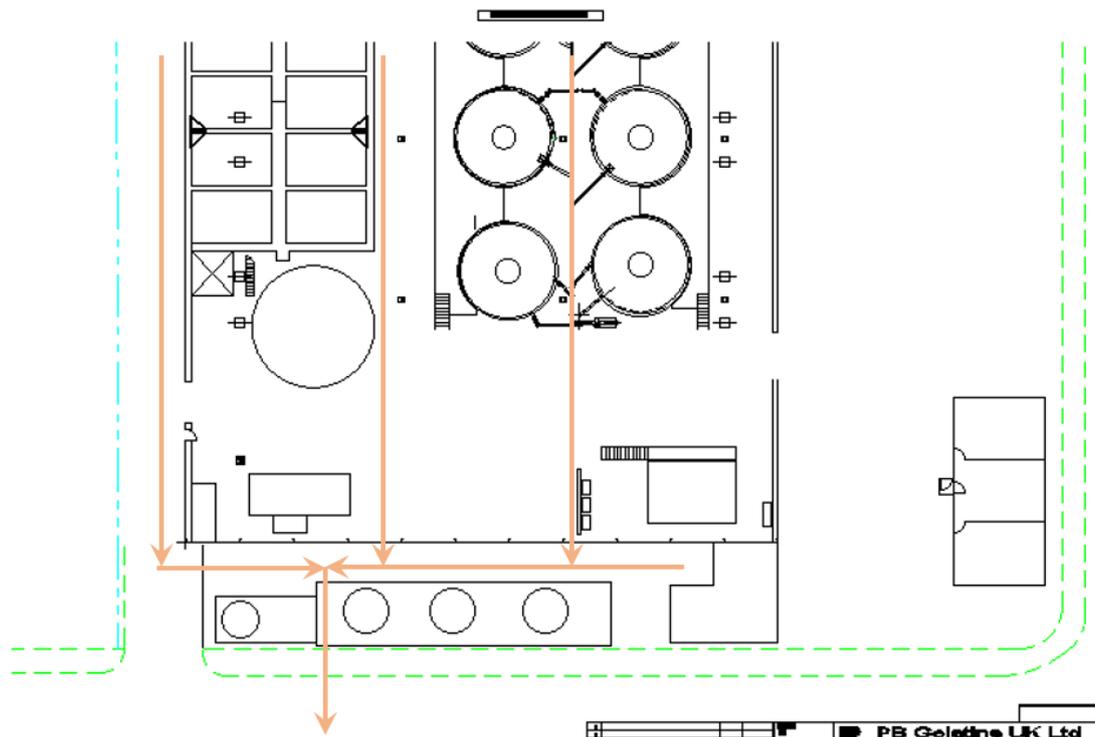


Figure 2: Proposed A21 Effluent Plant – Process Flow Diagram



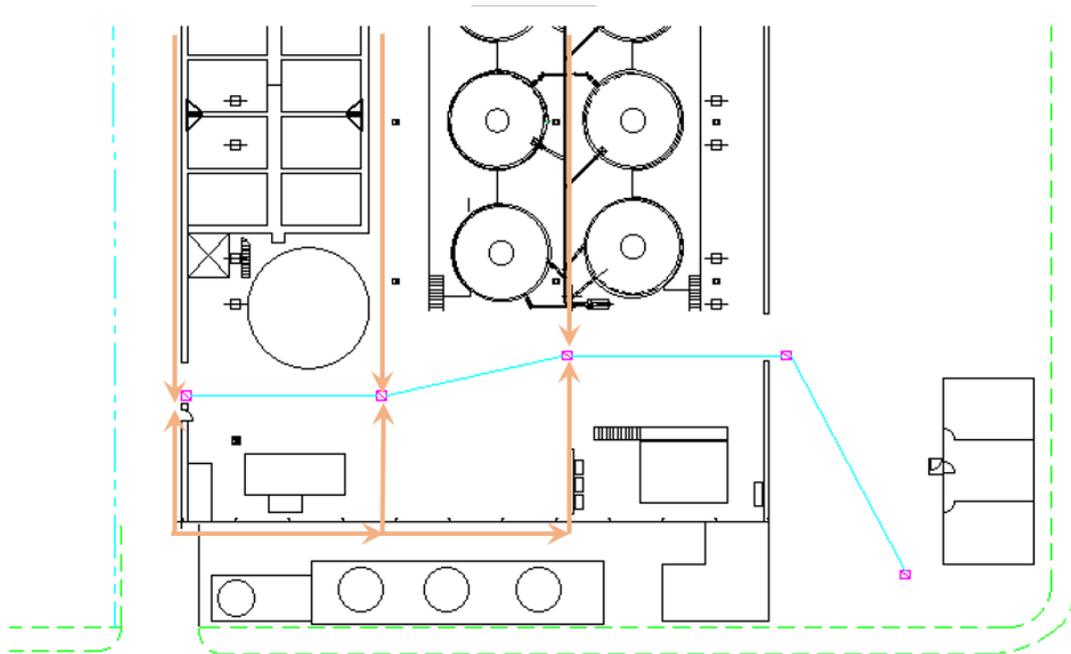
- 4.3.14. A further element of the effluent improvement proposals is the re-routing of the drainage system associated with the Liming Facility (A18). This will enable the current drainage system to be isolated and made redundant as shown as the cyan coloured drainage line on the Drainage Arrangements Plan (PBGE.01.09-02) contained in Section 3 of this application submission.
- 4.3.15. The manhole designated E14 will be reconstructed and it is proposed that 4 new plastic manhole chambers within the old liming building will be installed (see Figures 3 and 4). The drainage system to the western side of the building will be redirected to the new manhole changes by changing the elevation of the drainage line.
- 4.3.16. The old drainage system will be isolated and sealed.
- 4.3.17. The section of drains from A21 to the pumping station will be isolated by filling the system with foam concrete. The manhole covers will be removed and remedial work carried out to pavements and roads.
- 4.3.18. Figure 3 and 4 shows the indicative drainage changes proposed in Building A18.
- 4.3.19. Drawing PBGE.01.09-02 contained in Section 3 of this application submission details the current and proposed drainage lines, as well as the drainage lines to be made redundant.

Figure 3: Current Drainage System



Note to Figure: The drains within A18 run east to west before joining the main effluent stream from A21 at manhole E9 which is within Welsh Joint Education Committee Property.

Figure 4: Proposed Drainage System



Note to Figure: New drains will be installed in A18 (blue line) to enable waste water to be diverted directly to the effluent pumping station. The sections of the drains to the western side of the building will be modified to connect to the new drain line which will run through the old farm by changing the elevation of the drains. The manhole chamber E13 which is situated in the Gwaelod-y- Garth Road, will be removed and a section of pipe installed.

Additional Storage Areas

- 4.3.20. The EP boundary is proposed to be expanded to include Buildings A12 and A13 for storage of packaging material, WIP/intermediate material, as well as finished product.
- 4.3.21. This enables PB Gelatins to reduce the quantity of gelatin needed to be stored in external warehouses off-site. Storing the material on-site allows PB Gelatins flexibility to blend products, as well as reduces waiting time for batches to be returned to site and the associated transportation that is required.
- 4.3.22. The proposed EP boundary (green outline) is shown on the Site Layout Plan (PBGE.01.09-01) contained Section 3 of this submission.

Space Heaters and Biofilters

- 4.3.23. Two gas space heaters are proposed in the A18 'New Farm' and 'Millennium Farm' buildings for ambient heating of the buildings to ensure the contents within the liming pits remain at 16°C. Consequently, two point source emissions to air are proposed designated as EP22 and EP23 as shown on the Site Layout Plan (PBGE.01.09-01).
- 4.3.24. The installation of two new biofilters; one to service the A18 'New Farm' and 'Millennium Farm' Buildings and a second unit for the A18 'Old Farm' building are proposed.

- 4.3.25. The biofilters will reduce potential fugitive odour emissions from the blowing of the liming pits which releases ammonia and hydrogen sulphide gas. The addition of two additional point source emissions to air, designated EP26 and EP27, are proposed for the two biofilters and are shown on the Site Layout Plan (PBGE.01.09-01).

Raw Material Storage Vessels

- 4.3.26. As part of this variation application, a new 30m³ salt saturator vessel is proposed which is to be located to the rear of the A21 building as part of the abstracted water treatment process. The salt saturator produces brine which is used for the regeneration of the water softeners on the boiler feedwater and de ioniser systems. The brine is also used for the regeneration of the anion columns of the de ionisers. The new vessel eliminates the requirement for manual handling of 25kg bags of sodium chloride (salt).
- 4.3.27. A new integrally bunded 15m³ hydrogen peroxide tank to be located adjacent to the A18 'Old Farm' building is also proposed for use as part of the liming process to control microbiological growth in the ossein. The new system will discharge a set quantity of hydrogen peroxide into the discharge of the ossein reception intake pump to control microbiological growth within the ossein. The system improves the quality of the gelatin, as well as reduce odour as the ossein will have reduced microbiological loading.
- 4.3.28. The location of the proposed vessels are shown on the Site Layout Plan (PBGE.01.09-01).

Additional Point Source Emissions to Air

- 4.3.29. Ten additional emission points to air designated EP20-29 are proposed. These are shown on the Site Layout Plan (PBGE.01.09-01) contained in Section 3 of this application submission.
- 4.3.30. As detailed above, three new emission points are proposed associated with the two gas space heaters and the effluent treatment system balance tank wet scrubber.
- 4.3.31. This Permit variation application is also to capture seven existing emission points at the Installation which are not currently included in the Environmental Permit, including odour control system exhausts, and a hot water boiler exhaust.
- 4.3.32. The proposed point source emissions to air are discussed in detail in Section 5.

5. EMISSIONS

5.1. Point Source Emissions to Air – Current Arrangements

5.1.1. There are currently 15 emission points to air, designated EP4 to EP19 detailed in the Environmental Permit. The emission points are associated with the Installation's extraction tanks, driers, regenerator exhausts, vacuum pump exhausts and dust extraction exhaust.

5.2. Point Source Emissions to Air – Proposed Arrangements

5.2.1. PB Gelatins are proposing to add ten new point source emissions to air as follows:

- A21 extraction residue tanks exhaust – EP20;
- liming facility hot water boiler exhaust – EP21;
- A18 space heater exhausts – EP22 and EP23;
- DAF sludge tank odour control system exhaust – EP24;
- A18 balance tank odour control system exhaust – EP25;
- A18 biofilter exhausts – EP26 and EP27;
- A21 effluent treatment balance tank wet scrubber exhaust – EP28; and
- effluent pumping station sludge tank odour control system exhaust – EP29.

5.2.2. These points are all shown on Drawing PBGE.01.09-01 Site Layout Plan which is contained in Section 3 of this application submission.

A21 Extraction Residue Tanks Exhaust – EP20

5.2.3. The extraction residue vessels consist of two stainless steel tanks for extraction of gelatin from the extraction residue to increase yield. The extraction residue vessels will be used to further extract gelatin from the extraction residue which is achieved by filling the vessels with the residue and hot water. The liquid is then boiled for a defined period at a set temperature to produce a weak liquor gelatin.

5.2.4. The units have been designed by PB Gelatins and the emissions to air will consist of water vapour only.

A18 Hot Water Boiler and Space Gas Heaters (EP21, EP22 and EP23)

5.2.5. Detailed air quality modelling has been undertaken to predict the impacts associated with the proposed emissions from point source emissions from the boiler (designated EP21) and the two space heaters (designated EP22 and EP23).

5.2.6. It should be noted that the capacity of the boiler and space heaters are less than 1 megawatt thermal (MWth) and therefore, are not considered Medium Combustion Plants.

- 5.2.7. The study has been conducted to determine the impact of oxides of nitrogen (“NO_x”) and carbon monoxide (“CO”) on human health for receptors within a 2km radius of the Installation. Specified environmental receptors within both a 10km and 2km radius of the discharge stacks have also been assessed.
- 5.2.8. The Air Dispersion Modelling Study (PBGE.01.10/ADM), which is contained in Section 6 of this application, concluded that the emissions arising will not have a detrimental impact on local air quality, human health or the sensitive habitat sites assessed.

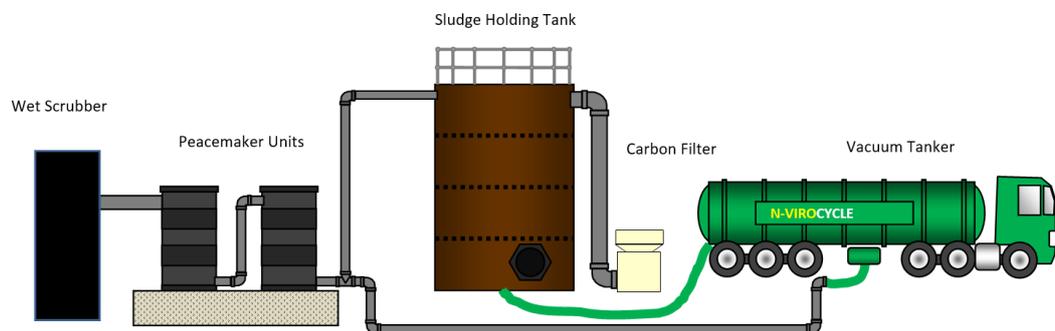
DAF Sludge Tank Odour Control System

- 5.2.9. The system consist of both dry and wet scrubber units, namely:
- Air Water Treatment (“AWT”) Peacemaker 1000 Module Systems; and
 - Air Water Treatment Activated Diox Wet Scrubber system.
- 5.2.10. The AWT Peacemaker technical data sheet is provided in Appendix II.
- 5.2.11. The odour abatement system is connected to the DAF unit sludge tank to prevent odorous gases being released.
- 5.2.12. The system consists of two Peacemaker units, which are dry scrubbers filled with Triox, which is a granular material, which absorb ammonia based compounds and hydrogen sulphides. The wet scrubber, running on choline dioxide follows the dry scrubbers. The air is drawn through the units by a small radial fan.
- 5.2.13. The DAF sludge holding tank is a fully contained tank which has been specifically designed to ensure leakage is very unlikely. Sludge is transferred from the DAF plant to the sludge tank in an enclosed pipe work system that ensures no odour can be released to the atmosphere. During routine operation, the extraction fan on the peacemaker unit draws the air containing emission gasses from the DAF sludge tank through the odour control system reducing any potential odours; fresh air is allowed through the passive carbon filter into the sludge tank to eliminate the vacuum.
- 5.2.14. Systems of monitoring are in place to ensure pumps, pipe work, connections, and valves are all in good working order.
- 5.2.15. During the tanker filling operation, the tanker connects to the sludge tank via a secured hose and the exhaust from the tanker connects the Peacemaker odour control units. Once the vacuum is achieved in the tanker, sludge is drawn from the sludge tank into the tanker. As the level reduces in the sludge tank, air is drawn in through the passive carbon filter to eliminate the vacuum within the sludge tank. Air within the tanker is expelled into the Peacemaker odour control system reducing the odours.
- 5.2.16. The DAF sludge odour control system consist of five main components:
1. Passive Carbon Filter: non-return valve (“NRV”) to allow air into the sludge vessel preventing a vacuum being produced which could potentially crush the storage vessel;

2. Peacemaker Units: dry scrubbing system constructed of black polypropylene vessels which contain Triox media and extruded coal based activated carbon which are designed to remove the H₂S, mercaptans and amine gases.
3. Duct Systems: PVC pipe work ducting used to connect the various items of the odour control system;
4. Extraction fan: centrifugal extraction fan which is fitted to the last peacemaker unit, which ensures that the system is under a vacuum; and
5. Wet scrubber: exhaust air from the Peacemaker passes through a wet scrubber containing a water and DIOX solution.

5.2.17. Figure 5 below provides the schematic of the DAF odour control system.

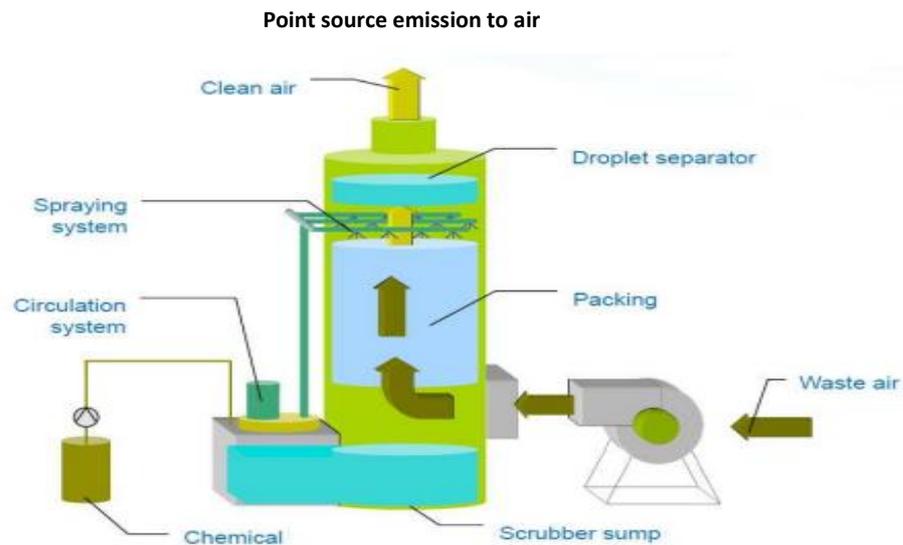
Figure 5: DAF Odour Control System Schematic



A18 Balance Tank Odour Control System (EP25) and A21 Balance Tank Odour Control System (EP28)

- 5.2.18. An acidic wet scrubber, namely the 'Tholander Packed Counter-Current Scrubber Type G-470-G' is present on the A18 balance tank and is to also be installed on the A21 effluent treatment balance tank to abate any malodours.
- 5.2.19. The Tholander counter current scrubber functional principles and characteristics are provided in Appendix III.
- 5.2.20. The principle of the counter-current scrubber is wet separation of contaminants from the gas phase into the liquid phase.
- 5.2.21. The gases to be scrubbed rise through a packed bed (filling material) from the bottom to the top of the scrubber while washing liquid flows from the top downwards. The gas flows in counter-current of the washing liquid. The chemical scrubber converts the ammonia gases to ammonia sulphates with the use of the sulphuric acid; a cleaning performance of 95-99% is achieved. The application of the counter current principle leads to the highest scrubbing rates for odours.
- 5.2.22. The scrubbing process is shown in Figure 6.

Figure 6: Acidic Wet Scrubber System Schematic



Biofilters – EP26 and EP27

- 5.2.23. Two vertical cartridge type biofilters (model KTFCA 56,000/2,400) with a capacity of 56,000m³/h will be installed to remove potential odorous gases from the liming facilities (new and Millenium farm buildings and the Old Farm building).
- 5.2.24. An efficiency of 97 to 99% for activated carbon filters and biological filters with cartridge-shaped filter elements filled with adsorbent material is guaranteed by the manufacturer.
- 5.2.25. The biofilters will consist of a vertical cartridge type biological filter containing a mixture of Canadian peat and activated carbon, provided with pre-scrubbing for the treatment of these captured contaminated gases and having a continuous and biological regeneration which increases the efficiency in the abatement of odours. The emissions to air output will be limited to nitrogen and water/condensate.
- 5.2.26. Basic components of the activated carbon biofilter are:
- external housing;
 - structure in form of double cylinder containing granulated activated carbon;
 - inclined bottom for activated carbon and peat;
 - coal replacement tank with feeding nozzle;
 - radial fan and stack; and
 - electrical panel.
- 5.2.27. The structural modules of the filter are made with materials of high chemical and corrosion resistance composed of glass fibre reinforced plastic internally coated with synthetic veil impregnated ester-vinyl resin.

- 5.2.28. The system will consist of the bio-filter which hold the media, radial fan, internal duct work within the building. The air is extracted from the liming facility building and passed through a water curtain, which is in the bio-filter, before entering the bio-filter column. Within the column, adsorption occurs in which pollutants in the fluid to be treated are trapped inside the pore structure of the carbon substrate.
- 5.2.29. The technical characteristics of the cartridge type activated carbon biofilter are provided in Table 3.

Table 3: Biofilter Specification

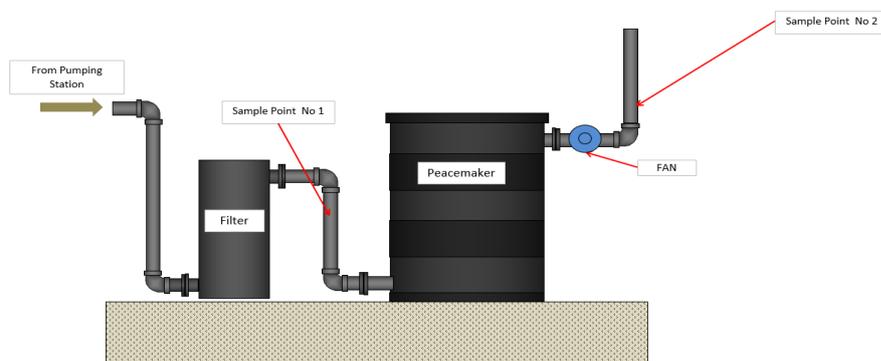
	Characteristic	Specification
Model KTFCA 56,000/2,400	Maximum Capacity (m ³ /h)	56,000
	Maximum Allowable Temperature at Inlet (°C)	40
	Average Temperature at Output (°C)	30 ± 5
	Maximum air speed at inlet and outlet of filter	10.0 ± 2.0
	Velocity of gas transposition through cartridge (m/s)	0.41-0.59
	Contaminant Removal Yield (%)	97-99
	Loss of Load Introduced by Filter (mmH ₂ O)	35 ± 5
	Activated carbon volume (m ³)	10.0
	Outside filter diameter	2.4
	Total height of filter	7,000
	Exhaust motor power (HP)	5 x 7.5
	Removal ability before activated carbon saturation (kg)	280-350
	Total installed power (HP) / kW	37.5 / 27.58
	Total weight (kg)	4,200

- 5.2.30. The full technical specification for the proposed biofilters is provided in Appendix IV.

Effluent Pumping Station Sludge Tank Odour Control System

- 5.2.31. The effluent pumping station benefits from a peacemaker dry scrubber on Triox media to remove H₂S. A sketch of the system is provided in Figure 7. This peacemaker is unaffected by high levels of moisture with the potentially odorous gasses off wastewater processes.

Figure 7: Effluent Pumping Station Sludge Tank Odour Control System Schematic



5.3. Point Source Emissions to Surface Water

- 5.3.1. There are no point source emissions to surface water. No changes are proposed as part of this variation application.

5.4. Point Source Emissions to Sewer – Current Arrangements

- 5.4.1. Process effluent from the site activities is currently discharged to foul sewer via emission point designated DP1. The trade effluent consent includes a limit of 3,000m³ with discharges typically in the region of 2,400m³ per day.

5.5. Point Source Emissions to Sewer – Proposed Arrangements

- 5.5.1. PB Gelatins propose to install a second discharge point to sewer to be designated DP2 to serve the new effluent treatment system associated with Building A21 process effluent. This proposed emission point is shown on the Site Layout Plan (PBGE.01.09-01).
- 5.5.2. A new trade effluent consent will be obtained from DCWW for this discharge point. Ongoing discussions with DCWW has created a chain of environmental responsibility to minimise pollution and to protect the environment as a whole.
- 5.5.3. It is anticipated that the trade effluent consent will include a discharge flow limit from DP2 of 1,500m³ per day with discharge likely to be in the region of 1,260m³ per day. A flow meter will be installed immediately prior to the discharge point to ensure quantities discharged are in accordance with the Trade Effluent Consent.
- 5.5.4. There are no relevant substances being discharged with associated environmental quality standards (“EQS”) as listed in the EA’s estuaries and coastal waters priority hazardous substances and specific pollutants and operational EQS spreadsheets, consequently an H1 assessment is not required as part of this application.

5.6. Point Source Emissions to Land

- 5.6.1. There are no emissions to land and no changes are proposed as part of this variation application.

5.7. Fugitive Emissions to Air

- 5.7.1. All plant and equipment will be operated in accordance with manufacturer manuals and instructions and subject to routine maintenance and inspection to ensure they are operating within set parameters and at optimal performance levels.
- 5.7.2. The operation of the biofilters will be in accordance with the manufacturer manual and instructions. The moisture content, drainage, pH, temperature, nutrient availability and the pressure drop across the biofilter media will be monitored and controlled within reasonable limits to maintain biofilter performance.

- 5.7.3. A contract will be in place with a specialist biofilter maintenance company who will attend site regularly to ensure the biofilters are achieving optimum odour control performance.
- 5.7.4. The activated carbon will be replaced in accordance with the manufacturer recommendations and inspections and maintenance will be included in the PPMR
- 5.7.5. The operation of the boiler and space heaters will also be in accordance with the manufacturer manual and instructions. Servicing of the boiler and heaters and maintenance of the extraction systems and discharge points will be undertaken as part of the PPMR which includes all plant and processing equipment. This will ensure optimal performance and to instigate any boiler tuning if deemed necessary.
- 5.7.6. The operation of the odour control systems will be in accordance with the manufacturer manual and instructions and servicing and maintenance of the extraction systems and discharge points is undertaken as part of the PPMR which includes all plant and processing equipment. The odour control units are checked on a monthly basis and a specialist odour control monitoring specialist undertakes bi-annual inspections as detailed in the Odour Management Plan (EMS 5.01) submitted in Section 8.

5.8. Fugitive Emissions to Surface Water, Sewer and Groundwater

- 5.8.1. Fugitive releases to the groundwater will be prevented by conducting all operations in areas sealed with an impervious barrier to prevent a pathway for migration to ground and groundwater. In order to ensure all effluent is treated in the new effluent treatment system, the Installation will not separate process and non-process wastewater as all drainage will be diverted to the effluent treatment area prior to discharging to foul sewer. This eliminates the risk of fugitive emissions to surface water.
- 5.8.2. All potentially polluting liquids will be appropriately bunded providing a minimum capacity of either 110% of the capacity of the largest storage vessel or 25% of the total capacity of all the storage vessels within the bund, whichever is greater. This includes the subsurface effluent holding tank, the balancing tank and the alkaline and acid dosing vessels.
- 5.8.3. The proposed hydrogen peroxide tank will be integrally bunded providing 110% capacity of the tank in case of loss of containment or spillage.
- 5.8.4. Overfill protection will be on bulk storage vessels and barriers and signage will be in place to prevent the risk of vehicle collision with storage vessels and bunding.
- 5.8.5. Appropriate isolation system will be installed to prevent any uncontrolled releases to foul water. PB Gelatins personnel are capable of identifying, holding and preventing the release of any materials should equipment the new effluent treatment system fail and the effluent not being fully treated. There will be excess capacity (40%) to ensure a buffer capacity is available as part of the proposed effluent treatment activities.

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- 5.8.6. All plant and equipment will be subject to regular maintenance and servicing as per the PB Gelatins maintenance programme contained within the Installation EMS. This will ensure all plant is in good working order to reduce the likelihood of fuel leakage at the Installation.
 - 5.8.7. External examinations of all storage vessels is undertaken by a qualified engineer on an annual basis and any actions undertaken in accordance with the engineer's recommendations. Additionally, any evidence of spillage/loss of containment, as well as the site infrastructure, including bunding and impermeable concrete surfacing, is inspected weekly. If remedial action is required, this will be reported immediately and the issue rectified as soon as possible.
 - 5.8.8. Any spillages at the Installation will be subject to the robust 'Emergency Preparedness and Response Plan' ("EPRP") (SHE 012) which includes spill response. This will prevent any potentially polluting materials from entering the Installation's drainage network.
 - 5.8.9. All relevant employees are suitably trained in spill response, such as the deployment of absorbent materials and drain covers. Spill kits are strategically located around the Installation with the contents regularly inspected and maintained.

6. GENERAL REQUIREMENTS

6.1. Emissions Management

6.1.1. The ERA (PBGE.01.09/ERA) has demonstrated that emissions of substances not controlled by emission limits (i.e. fugitive emissions) are not considered to be significant, consequently, an Emissions Management Plan is not required as part of this application.

6.2. Odour Management

6.2.1. The Installation has implemented an Odour Management Plan (“OMP”) (EMS 5.01) which forms part of the EMS and has been written in accordance with the requirements of NRW’s ‘How to Comply with your Environmental Permit, Additional Guidance for: H4 Odour Management’.

6.2.2. The OMP has been updated to take account of the proposed activities and is submitted in Section 8 of this variation application. The ERA has demonstrated that with strict adherence to the control measures set out in the OMP, the risk of odour emissions beyond the Installation EP boundary is not considered to be significant.

6.3. Noise Management

6.3.1. It is not considered that the changes proposed as part of this variation will result in noise nuisance being experienced by sensitive receptors in the surrounding area.

6.3.2. The ERA has demonstrated that with strict adherence to the control measures set out in the ERA, risk of noise emissions beyond the Installation EP boundary is not considered to be significant. Consequently, a Noise Management Plan is not required as part of this application.

6.4. Pest Management

6.4.1. As part of the Quality Management System (“QMS”) and the strict hygiene standards required for gelatine manufacture, a pest control system has been implemented at the Installation.

6.4.2. A summary of the pest control measures implemented at the Installation is provided below:

- regular cleaning and strict housekeeping standards. Infrastructure will be kept clear and be subject to housekeeping inspections and procedures. All equipment will be selected with ease of cleaning considered;
- surfacing kept clear to ensure easy cleaning where necessary;
- daily site checks which include checks for the presence of pests and to ensure housekeeping standards are maintained;
- waste storage in appropriate containers with frequent removal from site to prevent the attraction of pests to the site; and

- employment of an external contractor to implement and monitor a pest control programme at the Installation which includes monthly visits and follow up reports of any findings. These are discussed during management meetings for prompt close-out.

6.4.3. It is not considered that the changes proposed as part of this variation will lead to any significant increase in the attraction of pests to the Installation. The ERA demonstrates that with strict adherence to the control measures, the risk of pest nuisance is not considered to be significant. Consequently, a Pest Management Plan is not required as part of this application.

6.5. Fire Management

6.5.1. An 'Emergency Preparedness and Response Plan' has been prepared and implemented which includes how to effectively manage and report incidents and potential emergency situations including fire.

6.5.2. The fire risk management measures are summarised as follows:

- automatic fire detection system throughout the Installation;
- fire extinguishers and fire alarms are located in strategic locations throughout the Installation and are tested and maintained periodically;
- allocation and training of site incident commanders and support teams;
- preventative maintenance on all equipment to prevent any faults occurring which may lead to a fire; and
- unannounced fire evacuation drills undertaken twice per year to ensure all staff are appropriately trained in the fire response, escape routes and assembly points;
- any potentially contaminated firewater will be contained on site and sent for disposal off-site at a licenced facility following analytical testing.

7. APPLICATION SITE CONDITION REPORT

- 7.1. An updated Site Condition Report (“SCR”) (PBGE.01.09/SCR) has been prepared to take account of the proposed additional land to be included in the Environmental Permit boundary. The SCR is submitted in Section 7 of this variation application.

8. MONITORING

8.1. Monitoring of Emissions to Air

8.1.1. There is currently no requirement to undertake air emissions monitoring for the emission points denoted EP4 to EP19.

8.1.2. It should be noted that the capacity of the boiler and space heaters are less than 1 megawatt thermal (MWth) as detailed in Table 9 of the Air Dispersion Modelling Study (PBGE.01.10/ADM) submitted in Section 6 of this application. Therefore, they are not considered Medium Combustion Plants and it is not anticipated that there will be any monitoring requirements following the variation.

8.1.3. It is anticipated that PB Gelatins will be required to monitor odour concentrations annually once the updated Slaughterhouses and Animal By-products BRef comes into force.

8.2. Monitoring of Soil and Groundwater

8.2.1. Fugitive releases will be prevented by conducting all operations in areas sealed with an impervious barrier to prevent a pathway for migration to ground or groundwater. Consequently, no additional monitoring of soil and groundwater is proposed in addition to the existing Permit Condition 3.1.3. in which periodic monitoring shall be carried out every 5 years for groundwater and every 10 years for soil. This was last completed in October 2022 (see Section 7 of the Site Condition Report PBGE.01.09/SCR).

8.3. Monitoring of Surface Water

8.3.1. There are no point source emissions (i.e. process contributions) to surface water. Therefore, no monitoring of surface water is currently undertaken.

8.4. Monitoring of Foul Water – Current Arrangements

8.4.1. The current DP1 monitoring requirements contained in the EP are reproduced in Table 4 below.

Table 4: DP1 Monitoring Requirements

Emission Point	Parameter	Monitoring Frequency
DP1	pH	Continuous
	Suspended solids	Weekly
	Chemical Oxygen Demand (“COD”)	Weekly
	Discharge Flow	Continuous

8.4.2. At present, PB Gelatins undertake daily COD monitoring.

8.4.3. The existing trade effluent consent includes the following limits:

- pH – 5-11;
- total suspended solids – 2000 mg/l
- settled chemical oxygen demand – 8000 mg/l
- sulphide total – 1 mg/l;
- sulphate (as SO₄) – 1800 mg/l; and
- chloride – 1500 mg/l.

8.4.4. Periodic monitoring is undertaken by DCWW on a monthly basis to ensure that PB Gelatins are adhering to their Trade Effluent Consent, a copy of which is contained in Appendix I.

8.5. Monitoring of Foul Water – Proposed Arrangements

8.5.1. It is proposed as part of this variation that the monitoring requirements in the Permit correspond to the monitoring undertaken by DCWW and PB Gelatins i.e. monthly suspended solid monitoring. The proposed monitoring for both DP1 and DP2 is as follows:

- pH – continuous;
- suspended solids – monthly;
- COD – weekly; and
- discharge flow - continuous.

8.5.2. The BAT-AELs for indirect discharges contained in the Waste Treatments Bref are not applicable as the substance/parameters concerned are not relevant in this case.

8.5.3. Periodic monitoring is to be undertaken by DCWW to ensure that PB Gelatins are adhering to their new Trade Effluent Consent. The limits are envisaged to reflect those in Section 8.4.3. The flow rate is anticipated to be split equally across DP1 and DP2, with a combined total flow of 3,000m³/day.

9. RESOURCE EFFICIENCY AND CLIMATE CHANGE

9.1.1. PB Gelatins monitor the annual consumption of water, energy and raw materials, as well as the annual generation of residues and waste water, with a frequency of at least once a year.

9.2. Energy Efficiency Measures

9.2.1. A number of energy efficiency measures will be implemented at the Installation as part of the variation proposals to improve energy efficiency:

- purchase and installation of energy efficient equipment;
- purchase and use of efficient models, variable speed drives, motors and process control systems;
- use of heat recovery systems where possible;
- all plant and equipment will be regularly inspected and will be covered by service / maintenance contracts;
- a record is kept for each piece of machinery / plant detailing the routine servicing and maintenance required;
- the site operates a policy of switching off systems and machinery when not in use;
- completion of energy audits; and
- daily energy consumption monitoring and monthly reporting to the PB Gelatins Sustainability Director; and
- a working group was set up in 2021 to discuss and implement improvements site wide including energy use and energy efficiency.

9.3. Energy Consumption

9.3.1. As the effluent load will be split between A21 and A18 (the existing effluent treatment system and the new effluent treatment system), no significant increase in energy consumption associated with the new effluent system is anticipated.

9.3.2. Energy consumption from the two new space gas heaters will be less than 1% of the total gas consumption for the Installation.

9.3.3. Following implementation of the variation proposals, energy consumption monitoring will allow PB Gelatins to set realistic but challenging improvement targets to reduce energy consumption.

9.4. Climate Change Agreement

9.4.1. PB Gelatins entered into a Climate Change Agreement (“CCA”) on 1st October 2001. PB Gelatins are part of the sector umbrella agreement with the Food and Drink Federation (“FDF”). Their Target Unit Reference is FDF1/T00415 and evidence is provided in Appendix V of this document.

9.4.2. This CCA demonstrates PB Gelatins’ commitment to reducing energy consumption and associated carbon dioxide (“CO₂”) emissions.

9.5. Raw Material Justification

9.5.1. The following raw material consumption per annum as part of the variation proposals is estimated in Table 5. The associated material safety data sheets (“MSDS”) including the main hazards are provided in Appendix VI.

Table 5: Types and Amounts of Raw Materials

Schedule 1 Activity	Description of Raw Material and Composition Material	Maximum Amount (Litres)	Annual Throughput	Description of Use
	Water	n/a - mains	500m ³	Use in effluent treatment
Section 5.4 Part A1 (a) (ii)	Sodium Hydroxide	10,000*	24,000 litres	Effluent alkaline dosing
	Hydrogen Chloride	1,000	12,000 litres	Effluent acid dosing
Section 6.8 Part A1 (c)	Hydrogen Peroxide	15,000	25,000 litres (to achieve 3ppm in water)	Control of microbiological growth
Section 6.8 Part A1 (c)	Sodium Chloride / Brine Solution	30,000	390 tonnes	Regeneration of water softeners

Note to Table: * sodium hydroxide will be stored in the existing bunded storage vessel on site.

9.5.2. It is not possible to substitute materials with waste as part of the proposals, however, PB Gelatins undertake an annual review of raw material usage and investigate the suitability of raw materials with an improved environmental profile. Following implementation of the variation proposals, raw material consumption monitoring and reporting within the first year will allow PB Gelatins to set a baseline against which improvement targets can be set as part of the EMS.

9.5.3. Water use shall be minimised by implementation of the following measures:

- water management including water metering and water audits;
- impermeable surfacing;
- techniques to reduce the likelihood and impacts of overflows (level meters and gauges);
- flow control;
- design and maintenance provisions to allow detection and repair of leaks;
- optimised design and construction of equipment and process areas - the proposed effluent treatment design and selection of equipment will mean limited cleaning is required. The pumping chamber will be designed so that it has a sloping base so that it is self-cleaning to reduce the requirement to empty and clean. The static screens will have a self-cleaning system in integrated to reduce the water used. The balance tank will use Landia pumps which are designed to keep solids in suspension reducing the requirement to clean the tank thereby also reducing

odours;

- cleaning of equipment as soon as possible to prevent build-up;
- use and optimisation of water nozzles and hoses - cold water hoses will be installed in close proximity of the screening area for cleaning;
- appropriate buffer storage capacity;
- balance tank and screening building will have rainwater harvesting. This is as part of the Sustainable Drainage System (“SuDS”) design.

9.6. Waste Minimisation

9.6.1. As part of the initial concept and design of the improvement proposals, waste minimisation was considered.

9.6.2. The variation proposals aim to reduce the production of waste from the process. For instance, the greater the efficiency of the extraction residue process, the greater amount of gelatin from the residue will be captured, thus increasing yield and reducing waste.

9.6.3. Furthermore, the carbon media in the new bio-filters will be replaced periodically as required, however, the longevity of the system will be maximised by the monitoring of the efficiency of the system including regular ‘health checks’ ensuring the media is replaced at the optimal time. The installation of the bio-filters will enable the automatic aeration of the liming pits at an increased frequency, improving the quality of the gelatin and consequently, increasing the yield.

10. COMPLIANCE WITH BAT CONCLUSIONS

10.1. Appropriate BAT Conclusions – Waste Treatment BRef

- 10.1.1. It is considered that the techniques that will be in use at the Installation will constitute BAT will be appropriate and proportionate to the scale of the activities at the Installation and the risks that are posed to the environment by the activities.
- 10.1.2. The BAT requirements for the effluent treatment infrastructure improvements have been taken from the BRef for Waste Treatment (October 2018).
- 10.1.3. A demonstration of compliance with applicable BAT is provided in Table 6.
- 10.1.4. It is noted that these BAT Conclusions apply without prejudice to other relevant legislation, such as food safety.

Table 6: Waste Treatments BRef – BAT Conclusions

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
1	<p>In order to improve the overall environmental performance, BAT is to implement and adhere to an EMS that incorporates all of the following features:</p> <ol style="list-style-type: none"> I. commitment of the management, including senior management; II. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; III. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; IV. implementation of procedures; V. checking performance and taking corrective action; VI. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; VII. following the development of cleaner technologies; VIII. consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life; IX. application of sectoral benchmarking on a regular basis; X. waste stream management (see BAT 2); XI. an inventory of waste water and waste gas streams (see BAT 3); XII. residues management plan (see description in Section 6.6.5); XIII. accident management plan (see description in Section 6.6.5); XIV. odour management plan (see BAT 12); XV. noise and vibration management plan (see BAT 17). 	EPTR Document - Section 3
2	<p>In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below:</p> <ol style="list-style-type: none"> a) set up and implement waste characterisation and pre-acceptance procedures; b) set up and implement waste acceptance procedures; c) set up and implement a waste tracking system and inventory; d) set up and implement an output quality management system; e) ensure waste segregation; f) ensure waste compatibility prior to mixing or blending of waste; and g) sort incoming solid waste. 	The waste being treated is effluent resulting from the gelatine manufacturing process. Therefore, this BAT Conclusion is not relevant.

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
3	<p>In order to facilitate the reduction of emissions to water and air, BAT is to establish and maintain an inventory of waste water and waste gas streams, as part of the EMS that incorporates all of the following features:</p> <ul style="list-style-type: none"> i. information about the characterisation of the waste to be treated and the waste treatment processes ii. information about the characteristics of the waste water streams, such as <ul style="list-style-type: none"> (a) average values and variability of flow, pH, temperature and conductivity (b) average concentration and load values of relevant substances and their variability (e.g. COD/total organic carbon (“TOC”), nitrogen species, phosphorous, metals, priority substances/micropollutants (c) data on bio eliminability iii. information about the characteristics of the waste gas streams – n/a 	EPTR Document – Section 4.3, Section 8.4 and 8.5
4	<p>In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.</p> <ul style="list-style-type: none"> a) optimised storage location; b) adequate storage capacity; c) safe storage operation; and d) separate area for storage and handling of packaged hazardous waste – n/a 	ERA Document (Document reference PBGE.01.09/ERA)
5	<p>In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.</p>	EPTR Document - Section 3
6	<p>For relevant emissions to water as identified by the inventory of waste water streams, BAT is to monitor key processes parameters (e.g. waste water flow, pH, temperature, conductivity, biological oxygen demand (“BOD”)) at key locations (e.g. at the inlet and/or outlet of pretreatment, at the inlet to the final treatment, at the point where the emission leaves the installation).</p>	EPTR Document - Section 8.4 and 8.5

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
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General BAT Conclusions

BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, National or other international standards that ensure the provision of data of an equivalent scientific quality.

7

Substance/parameter	Standard(s)	Waste treatment process	Minimum monitoring frequency (1)(2)	Monitoring associated with
Adsorbable organically bound halogens (AOX) (1)(2)	EN ISO 9562	Treatment of water-based liquid waste	Once every day	BAT 20
Benzene, toluene, ethylbenzene, xylene (BTEX) (1)(2)	EN ISO 15680	Treatment of water-based liquid waste	Once every month	
Chemical oxygen demand (COD) (1)(2)	No EN standard available	All waste treatments except treatment of water-based liquid waste	Once every month	
		Treatment of water-based liquid waste	Once every day	
Free cyanide (CN ⁻) (1)(2)	Various EN standards available (i.e. EN ISO 14403-1 and -2)	Treatment of water-based liquid waste	Once every day	

EPTR Document - Section 8.4 and 8.5

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
7 (Cont.)	Hydrocarbon oil index (HOI) (1)	EN ISO 9377-2 Mechanical treatment in shredders of metal waste Treatment of WEEE containing VFCs and/or VHCs Re-refining of waste oil Physico-chemical treatment of waste with calorific value Water washing of excavated contaminated soil Once every month
	Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn) (1)	Various EN standards available (e.g. EN ISO 11885, EN ISO 17294-2, EN ISO 15586) Mechanical treatment in shredders of metal waste Treatment of WEEE containing VFCs and/or VHCs Mechanical biological treatment of waste Re-refining of waste oil Physico-chemical treatment of waste with calorific value Physico-chemical treatment of solid and/or pasty waste Regeneration of spent solvents Water washing of excavated contaminated soil Once every month
	Manganese (Mn) (1)	Treatment of water-based liquid waste Once every day
	Hexavalent chromium (Cr(VI)) (1)	Various EN standards available (i.e. EN ISO 10304-3, EN ISO 23913) Treatment of water-based liquid waste Once every day
	Mercury (Hg) (1)	Various EN standards available (i.e. EN ISO 17852, EN ISO 12846) Mechanical treatment in shredders of metal waste Treatment of WEEE containing VFCs and/or VHCs Once every month
		Treatment of water-based liquid waste Once every day

EPTR Document - Section 8.4 and 8.5

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance																					
General BAT Conclusions																							
7 (Cont.)	<table border="1"> <tr> <td></td> <td>Mechanical biological treatment of waste</td> <td></td> </tr> <tr> <td></td> <td>Re-refining of waste oil</td> <td></td> </tr> <tr> <td></td> <td>Physico-chemical treatment of waste with calorific value</td> <td></td> </tr> <tr> <td></td> <td>Physico-chemical treatment of solid and/or pasty waste</td> <td></td> </tr> <tr> <td></td> <td>Regeneration of spent solvents</td> <td></td> </tr> <tr> <td></td> <td>Water washing of excavated contaminated soil</td> <td></td> </tr> <tr> <td></td> <td>Treatment of water-based liquid waste</td> <td>Once every day</td> </tr> </table>		Mechanical biological treatment of waste			Re-refining of waste oil			Physico-chemical treatment of waste with calorific value			Physico-chemical treatment of solid and/or pasty waste			Regeneration of spent solvents			Water washing of excavated contaminated soil			Treatment of water-based liquid waste	Once every day	
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		Regeneration of spent solvents																					
		Water washing of excavated contaminated soil																					
		Treatment of water-based liquid waste	Once every day																				
	PFOA (†) PFOS (†)	No EN standard available	All waste treatments Once every six months																				
	Phenol index (†)	EN ISO 14402	<table border="1"> <tr> <td>Re-refining of waste oil</td> <td>Once every month</td> </tr> <tr> <td>Physico-chemical treatment of waste with calorific value</td> <td></td> </tr> <tr> <td>Treatment of water-based liquid waste</td> <td>Once every day</td> </tr> </table>	Re-refining of waste oil	Once every month	Physico-chemical treatment of waste with calorific value		Treatment of water-based liquid waste	Once every day														
	Re-refining of waste oil	Once every month																					
	Physico-chemical treatment of waste with calorific value																						
	Treatment of water-based liquid waste	Once every day																					
	Total nitrogen (Total N) (†)	EN 12260, EN ISO 11905-1	<table border="1"> <tr> <td>Biological treatment of waste</td> <td>Once every month</td> </tr> <tr> <td>Re-refining of waste oil</td> <td></td> </tr> <tr> <td>Treatment of water-based liquid waste</td> <td>Once every day</td> </tr> </table>	Biological treatment of waste	Once every month	Re-refining of waste oil		Treatment of water-based liquid waste	Once every day														
Biological treatment of waste	Once every month																						
Re-refining of waste oil																							
Treatment of water-based liquid waste	Once every day																						
Total organic carbon (TOC) (†)	EN 1484	<table border="1"> <tr> <td>All waste treatments except treatment of water-based liquid waste</td> <td>Once every month</td> </tr> <tr> <td>Treatment of water-based liquid waste</td> <td>Once every day</td> </tr> </table>	All waste treatments except treatment of water-based liquid waste	Once every month	Treatment of water-based liquid waste	Once every day																	
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Treatment of water-based liquid waste	Once every day																						
Total phosphorus (Total P) (†)	Various EN standards available (i.e. EN ISO 15681-1 and -2, EN ISO 6878, EN ISO 11885)	<table border="1"> <tr> <td>Biological treatment of waste</td> <td>Once every month</td> </tr> <tr> <td>Treatment of water-based liquid waste</td> <td>Once every day</td> </tr> </table>	Biological treatment of waste	Once every month	Treatment of water-based liquid waste	Once every day																	
Biological treatment of waste	Once every month																						
Treatment of water-based liquid waste	Once every day																						
Total suspended solids (TSS) (†)	EN 872	<table border="1"> <tr> <td>All waste treatments except treatment of water-based liquid waste</td> <td>Once every month</td> </tr> <tr> <td>Treatment of water-based liquid waste</td> <td>Once every day</td> </tr> </table>	All waste treatments except treatment of water-based liquid waste	Once every month	Treatment of water-based liquid waste	Once every day																	
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EPTR Document - Section 8.4 and 8.5.

Table 6 Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
8	Channelled emissions to air	n/a (effluent treatment plant)
9	Diffuse emissions of organic compounds (solvents)	n/a
10	BAT is to periodically monitor odour emissions	EMS 5.01 Odour Management Plan
11	BAT is to monitor the annual consumption of water, energy and raw materials, as well as the annual generation of residues and waste water, with a frequency of at least once a year.	EPTR Document - Section 9
12	In order to prevent or where that is not practicable to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan	See BAT 10.
13	In order to prevent or where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below: <ul style="list-style-type: none"> a. minimising residence times b. using chemical treatment c. optimising aerobic treatment 	EPTR Document - Section 6.2 ERA Document (Document reference PBGE.01.09/ERA)
14	In order to prevent or, where that is no practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below: <ul style="list-style-type: none"> a. minimising the number of potential diffuse emission sources b. selection and use of high-integrity equipment c. corrosion prevention d. containment, collection and treatment of diffuse emissions e. dampening f. maintenance g. cleaning of waste treatment and storage areas h. leak detection and repair ("LDAR") programme. 	EPTR Document - Section 6.2 ERA Document (Document reference PBGE.01.09/ERA)
15 & 16	Flaring – n/a	

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
17	In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the EMS.	
18	<p>In order to prevent or where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below:</p> <ul style="list-style-type: none"> a) appropriate location of equipment and buildings. b) operational measures. c) low-noise equipment. d) noise and vibration control equipment. e) noise attenuation. 	<p>EPTR Document - Section 6.3 ERA Document (Document reference PBGE.01.09/ERA)</p>
19	<p>In order to minimise water consumption, to reduce the volume of waste water generated and to prevent or where that is not practicable to reduce emissions to soil and water, BAT is to use an appropriate combination:</p> <ul style="list-style-type: none"> a) water management b) water recirculation c) impermeable surface d) techniques to reduce the likelihood and impacts of overflows and failures from tanks and vessels e) roofing of water storage and treatment areas f) segregation of water streams g) adequate drainage infrastructure h) design and maintenance provisions to allow detection and repair of leaks i) appropriate buffer storage capacity. 	EPTR Document - Section 9.5

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
20	<p>In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of techniques:</p> <p>Preliminary and primary treatment</p> <ul style="list-style-type: none"> a. equalisation b. neutralisation c. physical separation <p>Physico-chemical treatment</p> <ul style="list-style-type: none"> d. adsorption e. distillation/rectification f. precipitation g. chemical oxidation h. chemical reduction i. evaporation j. ion exchange k. stripping <p>Biological treatment e.g.</p> <ul style="list-style-type: none"> l. activated sludge process m. membrane bioreactor <p>Nitrogen removal</p> <ul style="list-style-type: none"> n. nitrification/denitrification when treatment includes a biological treatment <p>Solids Removal</p> <ul style="list-style-type: none"> o. coagulation and flocculation p. sedimentation q. filtration r. floatation 	<p>EPTR Document - Section 4.3- physical separation (screening and settlement), as well as neutralisation.</p>
<p>BAT AELs for direct discharges to receiving water – n/a.</p>		

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		

BAT Associated Emission Levels (“AELs”) for indirect discharges to receiving water body:

Table 6.2: BAT-associated emission levels (BAT-AELs) for indirect discharges to a receiving water body

Substance/Parameter	BAT-AEL (1) (2)	Waste treatment process to which the BAT-AEL applies
Hydrocarbon oil index (HOI)	0.5–10 mg/l	<ul style="list-style-type: none"> Mechanical treatment in shredders of metal waste Treatment of WEEE containing VFCs and/or VHCS Re-refining of waste oil Physico-chemical treatment of waste with calorific value Water washing of excavated contaminated soil Treatment of water-based liquid waste
Free cyanide (CN) (3)	0.02– 0.1 mg/l	<ul style="list-style-type: none"> Treatment of water-based liquid waste
Adsorbable organically bound halogens (AOX) (4)	0.2–1 mg/l	<ul style="list-style-type: none"> Treatment of water-based liquid waste
Metals and metalloids (5)	Arsenic (expressed as As)	0.01–0.05 mg/l
	Cadmium (expressed as Cd)	0.01–0.05 mg/l
	Chromium (expressed as Cr)	0.01–0.15 mg/l
	Copper (expressed as Cu)	0.05–0.5 mg/l
	Lead (expressed as Pb)	0.05–0.1 mg/l (6)
	Nickel (expressed as Ni)	0.05–0.5 mg/l
	Mercury (expressed as Hg)	0.5–5 µg/l
	Zinc (expressed as Zn)	0.1–1 mg/l (7)
	Arsenic (expressed as As)	0.01–0.1 mg/l
	Cadmium (expressed as Cd)	0.01–0.1 mg/l
	Chromium (expressed as Cr)	0.01–0.3 mg/l
	Hexavalent chromium (expressed as Cr(VI))	0.01–0.1 mg/l
	Copper (expressed as Cu)	0.05–0.5 mg/l
	Lead (expressed as Pb)	0.05–0.3 mg/l
	Nickel (expressed as Ni)	0.05–1 mg/l
	Mercury (expressed as Hg)	1–10 µg/l
	Zinc (expressed as Zn)	0.1–2 mg/l

(1) The averaging periods are defined in the General considerations.
 (2) The BAT-AELs may not apply if the downstream waste water treatment plant abates the pollutants concerned, provided this does not lead to a higher level of pollution in the environment.
 (3) The BAT-AELs only apply when the substance concerned is identified as relevant in the waste water inventory mentioned in BAT 3.
 (4) The upper end of the range is 0.3 mg/l for mechanical treatment in shredders of metal waste.
 (5) The upper end of the range is 2 mg/l for mechanical treatment in shredders of metal waste.

20

N/A – substances concerned are not anticipated to be within the wastewater stream.

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
21	<p>In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given as part of the accident management plan:</p> <ul style="list-style-type: none"> a. protection measures b. management of incidental/accidental emissions c. incident/accident registration and assessment system. 	ERA Document (Document reference PBGE.01.09/ERA)
22	In order to use material efficiently, BAT is to substitute materials with waste.	EPTR Document - Section 9.5
23	<p>In order to use energy efficiently, BAT is to use both techniques below:</p> <ul style="list-style-type: none"> a. Energy efficiency plan b. Energy balance record 	EPTR Document - Section 9.2 & 9.3
24	reuse of packaging – n/a	
BAT Conclusions for the Physico-chemical Treatment of Waste		
40	In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures.	n/a – effluent waste water produced on site – no waste input.
41	<p>In order to reduce emissions of dust, organic compounds and ammonia (“NH₃”) to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below:</p> <ul style="list-style-type: none"> a. Adsorption b. Biofilter c. Fabric filter d. Wet scrubbing. 	EPTR Document - Section 4.3 & 5.2

Table 6: Waste Treatments BRef – BAT Conclusions (Cont.)

BAT Ref No.	BAT Requirement	BAT Compliance
BAT Conclusions for the Treatment of Water-Based Liquid Waste		
52	In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures.	n/a – effluent waste water produced on site
53	<p>In order to reduce emissions of HCl, NH₃ and organic compounds to air, BAT is to apply BAT 14d and use one or a combination of the techniques:</p> <ul style="list-style-type: none"> a. Adsorption b. Biofilter c. Thermal oxidation d. Wet scrubbing. 	EPTR Document - Section 4.3 & 5.2.

10.2. Appropriate BAT Conclusions - Slaughterhouses and Animal By-products BRef

- 10.2.1. Compliance against BAT requirements within BRef for Slaughterhouses and Animal By-products (May 2005) has also been assessed for all aspects of the proposed variation.
- 10.2.2. A demonstration of compliance with applicable BAT is provided in Tables 7.
- 10.2.3. In order to future proof the proposals, the BAT requirements within the Final Draft of the BRef for Slaughterhouses and Animal By-products (March 2023) has also been assessed and demonstration of compliance with applicable BAT is provided in Table 8.
- 10.2.4. These BAT Conclusions apply without prejudice to other relevant legislation, such as food safety.

Table 7: Slaughterhouses and Animal By-products BRef – BAT Conclusions (May 2005)

BAT Ref No.	BAT Requirement	BAT Compliance
Section 5.1.1. – General Processes and Operations		
1	Use an environmental management system	EPTR Document – Section 3
2	Provide Training	EPTR Document – Section 3
3	Use a planned maintenance programme	EPTR Document – Section 3
4	Apply dedicated metering of water consumption	EPTR Document – Section 9.5
5	Separate process and non-process wastewater	EPTR Document – Section 5.8
6	Remove all running water hoses and repair dripping taps and toilets	n/a
7	Fit and use drains with screens and/or traps to prevent solid material from entering the wastewater	EPTR Document – Section 4.3 EPTR Document – Section 4.3
8	Dry clean installations and transport by-products dry, followed by pressure cleaning using hoses fitted with hand-operated triggers and where necessary hot water supplied from thermostatically controlled steam and water valves	EPTR Document – Section 6.4
9	Apply overfilling protection on bulk storage tanks	EPTR Document – Section 5.8
10	Provide and use bunds for bulk storage tanks	EPTR Document – Section 5.8 ERA Document (Document reference PBGE.01.09/ERA)
11	Implement energy management systems	EPTR Document – Section 9.2 & 9.3
12	Implement refrigeration management systems	n/a
13	Operate controls over refrigeration plant running times (n/a
14	Fit and operate chill room door closing switches	n/a
15	Recuperate heat from refrigeration plants	n/a

Table 7: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (May 2005)

BAT Ref No.	BAT Requirement	BAT Compliance
Section 5.1.1. – General Processes and Operations		
16	Use thermostatically controlled steam and water blending valves	n/a
17	Rationalise and insulate steam and water pipework	n/a
18	Isolate steam and water services	n/a
19	Implement light management systems	n/a
20	Store animal by-products for short periods and possibly to refrigerate them	EPTR Document – Section 4.3
21	Audit odour	EMS 5.01 Odour Management Plan
22	Design and construct vehicles, equipment and premises to ensure that they are easy to clean.	EPTR Document – Section 6.4
23	Clean materials storage areas frequently	EPTR Document – Section 6.4
24	Implement a noise management system	EPTR Document – Section 6.3
25	Reduce noise at, e.g. roof extract fans, balance lagoon blowers and refrigeration plants	EPTR Document – Section 6.3
26	Replace the use of fuel oil with natural gas, where a natural gas supply is available	EPTR Document – Section 6.3
27	Enclose animal by-products during transport, loading/unloading and storage	EPTR Document – Section 6.3
29	Export any heat and/or power produced which cannot be used on-site.	n/a - no heat or power will be produced that will be available for export off-site

Table 7: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (May 2005)

BAT Ref No.	BAT Requirement	BAT Compliance
Section 5.1.2. – Integration of Same Site Activities – N/A		
Section 5.1.3. – Collaboration with Upstream and Downstream Activities		
	BAT is to seek collaboration with upstream and downstream partners, to create a chain of environmental responsibility to minimise pollution and to protect the environment as a whole.	EPTR Document – Section 5.5
Section 5.1.4. - Installation and Equipment Cleaning		
	<p>For the cleaning of slaughterhouses and animal by-products installations, BAT is to do the following:</p> <ol style="list-style-type: none"> 1. Manage and minimise the quantities of water and detergents consumed 2. Select those detergents which cause minimise impact on the environment 3. Avoid, where possible, the use of cleaning and disinfectant agents containing active chlorine 4. Where the equipment is suitable, operate a cleaning-in-place system. 	EPTR Document – Section 9.5
Section 5.1.5. – Treatment of Waste Water		
	<p>For the treatment of waste water from slaughterhouses and animal by-products installations, BAT is to do the following:</p> <ol style="list-style-type: none"> 1. Prevent waste water stagnation 2. Apply an initial screening of solids using sieves at the slaughterhouse or animal by-products installation 3. Remove fat from waste water using a fat trap 4. Use a flotation plant, possibly combined with the use of flocculants to remove additional solids 5. Use a waste water equalisation tank 6. Provide a waste water holding capacity in excess of routine requirements 7. Prevent liquid seepage and odour emissions from waste water treatment tanks by sealing their sides and bases and either covering them or aerating them 8. Subject the effluent to a biological treatment process 9. Remove nitrogen and phosphorous 10. Remove the sludges produced and subject them to further animal by-product uses 11. Use CH₄ gas produced during anaerobic treatment for the production of heat and or power 	EPTR Document – Section 4.3

Table 7: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (May 2005)

BAT Ref No.	BAT Requirement	BAT Compliance														
Section 5.1.5. – Treatment of Waste Water (Cont.)																
	<p>12. Subject the resulting effluent to tertiary treatment</p> <p>13. Regularly conduct laboratory analyses of the effluent composition and maintain records.</p>															
	Emission levels associated with BAT for minimising waste water emissions from slaughterhouses and animal by-product installations.	EPTR Document – Section 8.4 & 8.5														
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>COD</th> <th>BOD₅</th> <th>SS</th> <th>Nitrogen (total)</th> <th>Phosphorus (total)</th> <th>FOG</th> </tr> </thead> <tbody> <tr> <td>Achievable emission level (mg/l)</td> <td>25 - 125</td> <td>10 - 40</td> <td>5 - 60</td> <td>15 - 40</td> <td>2 - 5</td> <td>2.6 - 15</td> </tr> </tbody> </table>	Parameter	COD	BOD ₅	SS	Nitrogen (total)	Phosphorus (total)	FOG	Achievable emission level (mg/l)	25 - 125	10 - 40	5 - 60	15 - 40	2 - 5	2.6 - 15	
Parameter	COD	BOD ₅	SS	Nitrogen (total)	Phosphorus (total)	FOG										
Achievable emission level (mg/l)	25 - 125	10 - 40	5 - 60	15 - 40	2 - 5	2.6 - 15										
Additional BAT for Animal By-Product Installations																
1	Operate continuous, dry and segregated collection of animal by-products throughout animal by-product treatment	n/a														
2	Use sealed, storage, handling and charging facilities for animal by-products	EPTR Document – Section 4.3														
3	Where it is not possible to treat animal by-products before their decomposition starts to cause odour problems and/or quality problems, refrigerate them as quickly as possible and for a short a time as possible	n/a														
4	Where inherently malodorous substances are used or are produced during the treatment of animal by-products, pass the low intensity/high volume gases through a biofilter.	EPTR Document – Section 4.3 and Section 5.2.														
Additional BAT for Gelatine Manufacture																
1	Insulate bone de-fatting equipment	n/a														

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
1	<p>In order to improve the overall environmental performance, BAT is to elaborate and implement an EMS that incorporates all of the following features:</p> <ol style="list-style-type: none"> i. commitment, leadership, and accountability of the management, including senior management, for the implementation of an effective EMS; ii. an analysis that includes the determination of the organisation’s context, the identification of the needs and expectations of interested parties, the identification of characteristics of the installation that are associated with possible risks for the environment (or human health) as well as of the applicable legal requirements relating to the environment; iii. development of an environmental policy that includes the continuous improvement of the environmental performance of the installation; iv. establishing objectives and performance indicators in relation to significant environmental aspects, including safeguarding compliance with applicable legal requirements; v. planning, and implementing the necessary procedures and actions (including corrective and preventive actions where needed), to achieve the environmental objectives and avoid environmental risks; vi. determination of structures, roles and responsibilities in relation to environmental aspects and objectives and provision of the financial and human resources needed; vii. ensuring the necessary competence and awareness of staff whose work may affect the environmental performance of the installation (e.g. by providing information and training); viii. internal and external communication; ix. fostering employee involvement in good environmental management practices; x. establishing and maintaining a management manual and written procedures to control activities with significant environmental impact as well as relevant records; xi. effective operational planning and process control; xii. implementation of appropriate maintenance programmes; xiii. emergency preparedness and response protocols, including the prevention and/or mitigation of the adverse (environmental) impacts of emergency situations; xiv. when (re)designing a (new) installation or a part thereof, consideration of its environmental impacts throughout its life, which includes construction, maintenance, operation and decommissioning. xv. Implementation of a monitoring and measurement programme; if necessary, information can be found in the Reference Report on Monitoring of Emissions to Air and Water from IED Installations; 	EPTR Document – Section 3

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
1 (Cont.)	<p>In order to improve the overall environmental performance, BAT is to elaborate and implement an EMS that incorporates all of the following features:</p> <ul style="list-style-type: none"> xvi. application of sectoral benchmarking on a regular basis; xvii. periodic independent (as far as practicable) internal auditing and periodic independent external auditing in order to assess the environmental performance and to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; xviii. evaluation of causes of nonconformities, implementation of corrective actions in response to nonconformities, review of the effectiveness of corrective actions in response to nonconformities, review of the effectiveness of corrective actions, and determination of whether similar nonconformities exist or could potentially occur; xix. periodic review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; xx. following and taking into account the development of cleaner techniques; <p>Specifically for slaughterhouses as well as the processing of animal by-products and/or edible co-products, BAT is also to incorporate the following features in the EMS:</p> <ul style="list-style-type: none"> xxi. an odour management plan xxii. an inventory of water, energy, raw materials consumption and of waste water and waste gas streams; xxiii. a chemical management system; xxiv. an energy efficiency plan; xxv. a water management plan; xxvi. a noise management plan; xxvii. an Other Than Normal Operating Conditions (“OTNOC”) management plan. xxviii. Refrigeration management plan for slaughterhouses – n/a 	EPTR Document – Section 3
2	<p>In order to improve the overall environmental performance, BAT is to establish, maintain and regularly review (including when a significant change occurs) an inventory of water, energy and process chemicals consumption, as well as of waste water and waste gas streams, as part of the EMS that incorporates all of the following features:</p> <ul style="list-style-type: none"> I. information about the production process II. Information about energy consumption and use; III. Information about water consumption and usage; IV. Information about the quantity and characteristics of the waste water streams V. Information about the characteristics of the waste gas streams 	EPTR Document – Section 9

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
2	VI. Information about the quantity and characteristics of the process chemicals used.	EPTR Document – Section 9
3	<p>In order to improve the overall environmental performance, BAT is to elaborate and implement a chemicals management system (“CMS”) as part of the EMS that incorporates all of the following features:</p> <ul style="list-style-type: none"> I. a policy to reduce the consumption and risks of process chemicals, including a procurement policy to select less harmful process chemicals and their suppliers with the aim of minimising the use and risks of hazardous substances and avoiding the procurement of an excess amount of process chemicals. II. Goals and action plans to avoid or reduce the use and risks of hazardous substances. III. Development and implementation of procedures for the procurement, handling, storage, and use of process chemicals to prevent or reduce emissions to the environment. 	EPTR Document – Section 9.5
4	<p>In order to reduce the frequency of the occurrence of OTNOC and to reduce emissions during OTNOC, BAT is to set up and implement a risk-based OTNOC management plan as part of the EMS that includes all of the following elements:</p> <ul style="list-style-type: none"> i. Identification of potential OTNOC (e.g. failure of equipment critical to the protection of the environment (‘critical equipment’) if their root causes and of their potential consequences, and regular review and update of the list of identified OTNOC following the periodic assessment below; ii. Appropriate design of critical equipment (e.g. waste water treatment plant); iii. Set up and implementation of an inspection and preventative maintenance plan for critical equipment; iv. Monitoring (i.e. estimating or where possible measuring) and recording of emissions during OTNOC and of associated circumstances; v. Periodic assessment of the emissions occurring during OTNOC and implementation of corrective action if necessary; vi. Regular review and update of the list of identified OTNOC under point i. following the periodic assessment of point v; and vii. Regular testing of back up systems. 	EPTR Document – Section 3.6
5	For waste water streams identified by the inventory of inputs and outputs, BAT is to monitor key process parameters (e.g. continuous monitoring of waste water flow, pH, and temperature) at key locations (e.g. the inlet and outlet of pretreatment, the inlet to the final treatment, the point where the emission leaves the installation.	EPTR Document – Section 8.5

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
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General BAT Conclusions

BAT is to monitor at least once per year:

- 6
- yearly consumption of water and energy;
 - yearly amount of waste water generated.
 - yearly amount of refrigerant(s) used to refill the cooling system in slaughterhouses – n/a

EPTR Document – Section 9

BAT is to monitor emissions to water with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

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Substance/parameter	Activities	Standard(s)	Minimum monitoring frequency (1)	Monitoring associated with
Adsorbable organically bound halogens (AOX) (2)	All activities	EN ISO 9562	Once every 3 months	BAT 14
Biochemical oxygen demand (BOD ₅) (3)		Various EN standards available (e.g. EN 1899-1, EN ISO 5815-1)	Once every month	
Chemical oxygen demand (COD) (3) (3)		No EN standard available	Once every week	
Total nitrogen (TN) (3)		Various EN standards available (e.g. EN 12260, EN ISO 11905-1)		
Total organic carbon (TOC) (3) (4)		EN 1484		
Total phosphorus (TP) (3)		Various EN standards available (e.g. EN ISO 6878, EN ISO 156811 and -2, EN ISO 11885)	Once every 6 months	
Total suspended solids (TSS) (3)		EN 872		
Copper (Cu) (3) (3)	Slaughterhouses	Various EN standards available (e.g. EN ISO 11885, EN ISO 17294-2 or EN ISO 15586)	Once every 6 months	
Zinc (Zn) (3) (3)				
Chloride (Cl ⁻) (3) (3)	<ul style="list-style-type: none"> • Slaughterhouses • Hide/skin salting • Gelatine manufacturing using bones 	Various EN standards available (e.g. EN ISO 103041, EN ISO 15682)	Once every month	—

(1) In the case of batch discharge less frequent than the minimum monitoring frequency, monitoring is carried out once per batch.
(2) In the case of an indirect discharge to a receiving water body, the monitoring frequency may be reduced to once every year for Cu and Zn and once every 6 months for AOX and Cl⁻, if the downstream waste water treatment plant is designed and equipped appropriately to abate the pollutants concerned.
(3) The monitoring only applies in the case of a direct discharge to a receiving water body.
(4) Either COD or TOC is monitored. TOC monitoring is the preferred option because it does not rely on the use of very toxic compounds.
(5) The monitoring only applies when the substance/parameter concerned is identified as relevant in the waste water stream based on the inventory of inputs and outputs mentioned in BAT 2.

EPTR Document – Section 8.5

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.

BAT Requirement

BAT Compliance

General BAT Conclusions

BAT is to monitor channelled emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Substance/Parameter	Activities/Processes	Standard(s)	Minimum monitoring frequency (*)	Monitoring associated with
CO	Combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases, including non-condensable gases	EN 15058	Once every year	BAT 15
	Incineration of carcasses			-
Dust	Combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases, including non-condensable gases	EN 13284-1		BAT 15
	Incineration of carcasses			-
NO _x	Combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases, including non-condensable gases	EN 14792		BAT 15
	Incineration of carcasses			-
SO _x	Combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases, including non-condensable gases	EN 14791		BAT 15
	Incineration of carcasses			-
H ₂ S	Rendering, fat melting, blood and/or feather processing (*)	No EN standard available		
NH ₃	Rendering, fat melting, blood and/or feather processing	EN ISO 21877		BAT 25
	Combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases, including non-condensable gases			-
	Incineration of carcasses			-
TVOC	Rendering, fat melting, blood and/or feather processing	EN 12619		BAT 25
	Combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases, including non-condensable gases			-
	Incineration of carcasses			-
Odour concentration	Slaughterhouses (*) (*)	EN 13725		-
	Incineration of carcasses (*)			-
	Gelatine manufacturing (*)			-
	Fishmeal and fish oil production (*)			-
	Rendering, fat melting, blood and/or feather processing (*)			BAT 25
HCl		EN 1911		
HF		No EN standard available		
Hg		EN 13211		
Metals and metalloids except mercury (As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Tl, V)	Incineration of carcasses	EN 14385		-
PCDD/F		EN 1948-1, EN 1948-2, EN 1948-3		

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EPTR Document – Section 8.1

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

Technique	Description	Applicability

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
	<p>In order to increase energy efficiency, BAT is to use technique (a) and an appropriate combination of the general energy saving techniques listed in technique (b) below.</p>	
9		EPTR Document – Section 9
10	<p>In order to reduce water consumption and the amount of waste water generated, BAT is to use technique (a) and (b) and one or a combination of the techniques (c) to (k) given below. Management, design and operation techniques:</p> <ul style="list-style-type: none"> a) Water management plan and water audits b) Segregation of water streams c) Water recycling and/or reuse d) Optimisation of water flow e) Use and optimisation of water nozzles and hoses 	EPTR Document – Section 9.5

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
10	<p>Techniques related to cleaning operations:</p> <ul style="list-style-type: none"> f) Dry cleaning; g) High pressure cleaning; h) Optimisation of chemical dosing and water use in cleaning in place i) Low pressure foam and/or gel cleaning; j) Optimised design and construction of equipment and process areas; and k) Cleaning of equipment as soon as possible. 	EPTR Document – Section 9.5
11	<p>In order to prevent or, where that is not practicable, to reduce the use of harmful substances, e.g. in cleaning and disinfection, BAT is to use one or a combination of the techniques given below.</p> <ul style="list-style-type: none"> a) Proper selection of cleaning chemicals and or disinfectants; b) Reuse of cleaning chemicals in Clean in Place (“CIP”); c) Dry cleaning; d) Optimised design and construction of equipment and process areas. 	EPTR Document – Section 9.5
12	<p>In order to increase resource efficiency, BAT is to use one or a combination of the techniques given.</p> <ul style="list-style-type: none"> a) Minimisation of biological degradation of animal by-products and/or edible coproducts; b) Residues separation and recycling/recovery; c) Anaerobic digestion; d) Phosphorus recovery as struvite – n/a 	n/a
13	<p>In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for generate waste water.</p>	EPTR Document – Section 5.8

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions	<p>In order to reduce emissions to water, BAT is to use an appropriate combination of the techniques given below:</p> <p>Preliminary, primary and general treatment</p> <ul style="list-style-type: none"> a) Equalisation (all pollutants) b) Neutralisation (acids, alkalis) c) Physical separation (e.g. screens, sieves, grit separators, fat separators, or primary settlement tanks. (gross solids, suspended solids, oil/grease). <p>Physico-chemical treatment e.g.</p> <ul style="list-style-type: none"> d) Precipitation (precipitable dissolved non-biodegradable or inhibitory pollutants e.g. metals) e) Evaporation (soluble pollutants) f) Chemical oxidation with ozone (reducible dissolved non-biodegradable or inhibitory pollutants e.g. AOX). <p>Aerobic and/or anaerobic treatment (secondary treatment)</p> <ul style="list-style-type: none"> g) Aerobic and/or anaerobic treatment (secondary treatment) e.g. activated sludge process, aerobic lagoon, anaerobic contact process, membrane bioreactor (biodegradable organic compounds). <p>Nitrogen removal</p> <ul style="list-style-type: none"> h) Nitrification and/or denitrification (total nitrogen ammonium/ammonia) <p>Phosphorous removal</p> <ul style="list-style-type: none"> i) Precipitation j) Enhanced biological phosphorous removal <p>Final solids removal</p> <ul style="list-style-type: none"> k) Coagulation and flocculation l) Sedimentation m) Filtration (e.g. sand filtration, microfiltration, ultrafiltration) n) Flotation <p>BAT associated emission levels for direct discharges to a receiving water – n/a emissions being discharged to sewer for treatment at an off-site effluent treatment plant prior to discharge to receiving water.</p> <p>BAT associated emission levels for indirect discharges to a receiving water body – do not apply if downstream waste water treatment plant is designed and equipped appropriately to abate the pollution concerned, provided this does not lead to higher level of pollution in the environment and the BAT-AEL only applies when the substance/parameter concerned is identified as relevant in the waste water stream based on the inventory of inputs and outputs.</p>	<p>EPTR Document – Section 4.3 - physical separation (screening and settlement), as well as neutralisation.</p>
14		

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
15	Emissions to air – combustion of malodorous gases	n/a
16	<p>In order to prevent or where that is not practicable to reduce noise emissions, BAT is to set up, implement and regularly review a noise management plan as part of the EMS that includes all of the following elements:</p> <ul style="list-style-type: none"> • A protocol containing actions and timelines • A protocol for conducting noise emissions monitoring • A protocol for responses to identified noise events e.g. complaints • A noise reduction programme designed to identify the source(s) to measure/estimate noise, to characterise the contributions of the sources and to implement prevention and/or reduction measures. 	<p>EPTR Document – Section 6.3 ERA Document (Document reference PBGE.01.09/ERA)</p>
17	<p>In order to prevent or where that is not practicable to reduce noise emissions, BAT is to use one or a combination of the techniques given below:</p> <ol style="list-style-type: none"> a) appropriate location of equipment and buildings b) operational measures c) low noise equipment d) noise control equipment e) noise abatement 	
18	<p>In order to prevent or where that is not practicable to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the EMS that includes all of the following elements:</p> <ul style="list-style-type: none"> • a protocol containing actions and timelines • a protocol for conducting odour monitoring. It may be complemented by measurement/estimation of odour exposure or estimation of odour impact • a protocol for response to identified odour incidents e.g. complaints • an odour prevention and reduction programme designed to identify the source(s); to measure/estimate odour exposure; to characterise the contributions of the sources; and to implement prevention and/or reduction measures. 	EMS 5.01 Odour Management Plan

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
19	<p>In order to prevent or where that is not practicable to reduce odour emissions, BAT is to use all of the techniques given below.</p> <ul style="list-style-type: none"> a) regular cleaning of installations and equipment b) cleaning and disinfection of vehicles and equipment used to transport and deliver animal by products and or edible co products c) enclose animal by-products and/or edible co-products during transport, loading/unloading and storage prevention of biological degradation of animal by-products and/or edible co-products. d) minimisation of biological degradation of animal by products and/or edible co-products. e) Air extraction as close as possible to the point of odour generation. 	EPTR Document – Section 4.3, 6.2, 6.4 and 9.5
20	In order to prevent emissions of ozone-depleting substances and of substances with a high global warming potential from cooling and freezing, BAT is to use refrigerants without ozone depletion potential and with a low global warming potential	n/a
BAT Conclusions for Installations Processing Animal By-products and/or Edible Co-Products		
		Technique a (multistage evaporation) is not applicable.
24	<p>In order to increase energy efficiency, BAT is to use appropriate combination of the techniques specified in BAT 9, and of the technique given below.</p> <ul style="list-style-type: none"> a) multistage evaporation – evaporators used to remove water from liquid mixtures generated for example in fat melting, rendering, fishmeal and fish oil production are multistage, where steam is introduced in a series of successive vessels, each one exhibiting a lower temperature and pressure than the previous one. <p>BAT associated environmental performance levels for specific energy consumption in installations processing animal by-products and/or edible co-products – gelatin manufacture – 1380-2110 or 2 580 kWh/tonne for installations applying hot air drying.</p> <p>BAT associated environmental performance levels for specific waste water discharge – gelatine manufacturing – m³/tonne of raw material = 16.5-27.</p>	<p>In relation to the BAT associated performance levels: The overall energy consumption is not anticipated to change significantly. 2022 performance = 81524000kWh/33,211 tonnes of ossein = 2,455</p> <p>Production of waste water discharge not anticipated to change as a result of the effluent treatment proposals. 2022 performance = 704,522m³/33,211 tonnes of ossein= 21.</p>

Table 8: Slaughterhouses and Animal By-products BRef – BAT Conclusions (Cont.) (March 2023)

BAT Ref No.	BAT Requirement	BAT Compliance
General BAT Conclusions		
BAT Conclusions for Installations Processing Animal By-products and/or Edible Co-Products		

In order to reduce emissions to air of organic compounds and malodorous compounds, including H₂S and NH₃, BAT is to use one or a combination of the techniques given below.

Technique	Description
a. Condensation	See Section 5.4.2. The technique is used together with one or a combination of the techniques (b) to (g) for the treatment of non-condensable gases. See Section 5.4.2
b. Adsorption	
c. Biofilter	
d. Combustion in a steam boiler of malodorous gases, including non-condensable gases	
e. Thermal oxidation	
f. Wet scrubber	
g. Bioscrubber	

Table 5.10: BAT-associated emission levels (BAT-AELs) for channelled emissions to air of odour, organic compounds, NH₃ and H₂S from rendering, fat melting, blood and/or feather processing

Substance/Parameter	Unit	BAT-AEL
Odour concentration	ou _e /m ³	200–1 100 ⁽¹⁾ ⁽²⁾
TVOC	mg C/Nm ³	0.5–16
NH ₃	mg/Nm ³	0.1–4 ⁽³⁾
H ₂ S		< 0.1–1 ⁽⁴⁾

⁽¹⁾ The BAT-AEL range may not apply in the case of combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases when both of the following conditions are fulfilled:

- the combustion temperature is sufficiently high (typically in the range 750-850 °C) with a sufficient residence time (typically between 1 and 2 seconds) and
- the odour abatement efficiency is ≥ 99 %, or as an alternative, process odour is not perceptible in the treated waste gases.

⁽²⁾ In the case of abatement technique(s) other than combustion of malodorous gases, the upper end of the BAT-AEL range may be higher and up to 3 000 ou_e/m³ if the abatement efficiency is ≥ 92 % or, as an alternative, process odour is not perceptible in the treated waste gases.

⁽³⁾ The upper end of the BAT-AEL range may be higher and up to 7 mg/Nm³ in the case of combustion (e.g. in thermal oxidisers or steam boilers) of malodorous gases.

⁽⁴⁾ The BAT-AEL range only applies when H₂S is identified as relevant in the waste gas stream based on the inventory of inputs and outputs mentioned in BAT 2.

The associated monitoring is given in BAT 8.

EPTR Document –
Section 4.3 & 5.2.

BAT-AELs not directly applicable.

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APPENDIX I

TRADE EFFLUENT CONSENT

Company

P B Gelatins (UK) Ltd
Factory A21 & A18
Treforest Ind Estate
Pontypridd
CF37 5SU

Consent No. TE 372**Receiving Works** Cardiff East**Council Area** Rhondda Cynon Taff**Sample Point** 300035**Nature of Discharge**

Gelatin Manufacturer

Date Consent IssuedMarch 5th 1990**Date Direction 1 Issued**February 15th 2002**Date Direction 2 Issued**February 28th 2013**Status**

Active

Current Consent Conditions**Maximum Permissible Value****pH**

Between 5 and 11

Flow Max3000 m³/day**Flow Rate**150 m³/hour**Total Suspended Solids**

2000 mg/l

Settled COD

8000 mg/l

Sulphide Total

1 mg/l

Sulphate (as SO₄)1800 mg/l as SO₄**Chloride**

1500 mg/l

APPENDIX II

AWT PEACEMAKER TECHNICAL DATASHEET



OCS Peacemaker

A Modular Approach To Odour Control

peace'mak'er, n.

- One who makes peace or reconciles parties at variance
- Allays agitation, calms

Easy Installation

- Remove manhole cover and clean rim
- Place PEACEMAKER insert on frame rim and add media
- Replace cover

Summary of Advantages

- Durable, no maintenance, no corrosion
- Constant venting of line pressure
- Superior malodor control
- Three-year guarantee
- Minutes to install
- Economic

John Naylor B.Sc.(Hons.),
Odour Control Systems Limited

Malcolm Beeston B.Sc.,
Odour Control Systems Limited

James Mitchell B.Sc.(Hons.) M. I.W.E.M.,
Anglian Water Services Limited

Abstract

The aim of this paper is to introduce a new concept to odour control design strategies for Waste Water Treatment Works. This new concept involves intimately serving odour sources by application of a newly developed modular odour control system - the Peacemaker.

Traditional designs have been dictated by the use of Biofiltration methods utilising one, maybe two centralised filters to serve diverse odour sources using long runs of extract ductwork. The modular Peacemaker approach eliminates this and provides several other key benefits to designers and the client.

The installation of an odour control unit on the digester sludge feed storage tank at Colchester Waste Water Treatment Works is the specific subject considered in the second part of this presentation. The design criteria and the method of choosing the Peacemaker as the preferred option will be discussed.

Introduction

Based upon increasing legislation, together with the ever-increasing awareness of the public to odour nuisance, there is a continuing review of odour abatement systems within the Waste Water Treatment Industry. The paper introduces a newly designed abatement system and an integrated approach to design thinking.

Odour Abatement Systems - Water Industry Standards

Generally speaking, there are 4 standard types of odour abatement systems (excluding chemical dosing) currently employed throughout the Waste Water Treatment Industry.

- Adsorption Filters (e.g. carbon).
- Dry Chemical Scrubbers (using potassium permanganate).
- Biological Filters/Scrubbers.
- Wet Chemical Scrubbers.

Of these 4 types, it is fair to say for reasons of cost effectiveness, that the Waste Water Treatment Industry over the past 7 years, has invested most heavily in Biological Filter systems.

Odour Abatement Systems - Water Industry Standards - continued

The very nature of Biological Filters has dictated the thinking of Design Engineers in planning odour abatement systems for Waste Water Treatment Plants. The filters' requirements of long retention time, steady state odour loadings without peaks, need for water/final effluent supply (combined with the fact that the plant has a number of distant odour sources), have meant that the most cost effective design is usually that of a large centralised filter, catering for a multiple number of odour sources via extensive ductwork runs.

The result is the need for costly civils to provide a base for the filter, large capacity extract fans to provide for dilution air to ensure odour peaks from process sources do not go beyond the upper limits of the filters (i.e. 50 ppm for peat and heather types and 100 ppm for calcified seaweed types) and costly, inefficient and complex ductwork runs which can present Health and Safety problems and look unsightly above ground.

Due to these shortcomings, Odour Control Systems Ltd, and it's American associates, Syneco Systems Inc., have developed the Peacemaker Odour Filter-Scrubber together with a modular approach to odour control.

What is the Peacemaker?

Of the 4 standard types of system listed above, the Peacemaker system falls across the categories of Adsorption Filters and Dry Chemical Scrubbers, hence the term Peacemaker Filter-Scrubber.

It is a system of modular design, based upon dual chambered vessels (or modules) manufactured from corrosion resistant, heavy duty plastic and G.R.P materials. It does not utilise a water supply.

Each dual chambered vessel (or module) comprises:

- (A) A Foul Air Inlet Chamber (B) Lower Air Diffusion Plate (C) Lower Odour Oxidising Media Chamber
(D) Middle Air Diffusion Plate (E) Upper Odour Polishing Media Chamber (F) Clean Air Outlet Vent

The system is completed by interconnecting ductwork, flow balancing valves and air extraction fans.

As with other fan assisted odour abatement systems, the extraction fan creates a partial vacuum via connecting ductwork to the covered odour source to avoid odour leakage. Foul air is pulled into the inlet chamber and diffused via the lower diffuser, which is designed to maximise its distribution across the surface areas of the medias. It is firstly drawn upwards through the oxidising chamber, which contains dry impregnated media granules.

The impregnate is chlorine dioxide, which is stabilised within the media. The impregnation and stabilisation process is patented. Chlorine Dioxide is a very powerful oxidising agent e.g. 2.5 times that of chlorine and 4 times that of potassium permanganate. The result is a media bed of high odour removal capacity.

Chlorine Dioxide rapidly oxidises the most odorous compounds found in off-gases from wastewater treatment processes.

e.g. Sulphides to Sulphates Mercaptans to Sulphonates and Sulphonic Acids Amines to Carboxylic Acids

Products of reaction are odourless and environmentally sound (e.g. no chlorinated organics are formed)

From the lower oxidising chamber, air is then drawn into the upper odour polishing chamber, which contains adsorptive media to provide further removals of any remaining non oxidisable odorous compounds.

Several adsorptive medias are used depending upon the odour polishing requirements.

This Peacemaker oxidising/adsorption or filter-scrubbing process offers large odour removal capacities per module and provides excellent odour removals performance.

Odour Removals Performance

- (1) Independent testing has shown that the Peacemaker is capable of effectively removing 100% hydrogen sulphide and mercaptan compounds, even at very high peak loadings. (See table 1)
- (2) T.O.N. removals in the 95 –99% range by a single module. (See figures 2 + 3)
- (3) Ability to handle shock loadings of over 1000ppm H₂S without significant odour breakthrough. Whilst also maintaining media bed stability

Table 1. summarises some of this work and more odour removals performance will be discussed in the second half of this paper.

Table 1: Typical Peacemaker Odour Removals Performance

		Peacemaker Inlet		Peacemaker Outlet	
Day No	Time	Mercaptans ppm	H ₂ S ppm	Mercaptans ppm	H ₂ S ppm
1	10.55	60	30	0	0
1	14.45	120	102	0	0
1	23.00	120	31	0	0
2	08.30	120	117	0	0
2	14.45	60	35	0	0
2	22.35	15	6	0	0
3	03.25		5		0
3	12.00	15	28	0	0
3	20.10	10	8	0	0
4	08.45	6	3	0	0
4	22.55	100	40	0	0
4	22.55	100	52	0	0
5	09.30	10	6	0	0
5	20.00	100	52	0	0
6	08.00	120	50	0	0
6	20.10	120	200	0	0
7	15.10	100	45	0	0
7	20.10	120	200	0	0
8	08.15	135	71	0	0
8	16.30		13		0
8	20.25	50	200	0	0
9	11.55	60	18	0	0
10	09.25	8	10	0	0
10	17.20		3		0
11	01.20	2.5	1	0	0
11	09.25	80	36	0	0
11	19.00	80	39	0	0
12	02.40	60	68	0	0
12	09.40	120	46	0	0
12	17.25	65	15	0	0
12	20.15	5	3	0	0
13	09.50	120	72	0	0
13	18.45	80	33	0	0
13	20.05	120	130	0	0
14	10.10	120	99	0	0
14	14.10	120	165	0	0
14	20.30	240	115	0	0
15	19.50	85	67	0	0
16	09.25	120	41	0	0
16	20.15	240	66	0	0
16	22.50		38		0
17	09.00	20	14	0	0
18	00.59	120	88	0	0
18	03.25	120	102	0	0
19	17.40	4	1	0	0
19	20.40	60	80	0	0
20	08.05	120	28	0	0
20	19.40	10	11	0	0
21	04.30	60	80	0	0
21	12.35	30	8	0	0
21	19.50	120	21	0	0
22	09.30	20	4	0	0
22	17.00	120	31	0	0
22	19.30	55	10	0	0
23	09.00	70	9	0	0
23	19.40	23	11	0	0
24	09.15	30	3	0	0
24	21.15	120	34	0	0
25	11.40	120	39	0	0
25	20.10	120	64	0	0

NOTE: Peacemaker System treating off gases from Sludge Reception Chamber at a North West Water Ltd. Site.

continued overleaf >>>

Modular Design Provides Flexibility

There are currently 6 basic Peacemaker modules, the 500, 1000, 3000, 4000, 9000 and 18000. Their characteristics are shown in Table 2.

Table 2. Characteristics of Peacemaker Modules			
Module	Typical Footprint m ²	Typical Charged Weight Kgs	Typical Gas Flow Capacity m ³ /Hr
500	0.5	300	250
1000	1.00	1000	1000
3000	2.50	2080	2000
4000	3.00	3000	3000
9000	5.00	4500	5000
18000	9.00	6200	10000

These modules are the building blocks of the Peacemaker Filter-Scrubber System. They can be used singly or coupled in parallel or series for treatment of a very wide range of gas flows and odour loadings; indeed the design of any system and selection of module combination is dictated by required gas extract rate from the source (i.e. flow through the unit) and odour concentrations to be handled.

This modular approach provides great flexibility in system layout design and offers several key benefits to the client when compared to existing standard technologies being used.

These Include:

- (A) The small footprint requirements of systems make it possible to intimately serve odour sources
- (B) This greatly reduces civils requirements, both in terms of area required & also in terms of loadings per unit area

For example, typical civils loadings requirements for Peacemaker systems are in the 0.25 – 10kn per square metre range
- (C) 'Intimately serving' odour sources eliminates costly and unsightly long ductwork runs from designs
- (D) Short ductwork runs improve gas removal efficiencies and increase reliability of the system's ventilation rate
- (E) As a 'dry' system, it requires only an electrical supply (no water or final effluent) which is usually readily available close to odour sources such as Sludge tanks, Desludge Chambers, Inlet Wells etc

A list of Peacemaker Installations is given in Table 3. and we would, in particular, like to draw your attention to the Anglian Water sites at Bedford Sewage treatment Works and Colchester Sewage Treatment Works, as clear examples of where the approach is working.

Table 3: OCS Peacemaker Filter-Scrubber Reference Installation List

Client	Location	Application	Gas Flows m ³ /Hr	Typical Odour Loadings H ₂ Sppm
North West Water Ltd	Royton, Gtr Manchester	Sludge Tanks	400	100
North West Water Ltd	Goytside, Cheshire	Pumping Station	200	50
Anglian Water Services Ltd	Salcott, Essex	Sludge Tank	100	100
Anglian Water Services Ltd	The Boot, Bedfordshire	Pumping Station	100	50
Anglian Water Services Ltd	Leighton Linslade	a. PST Desludge Wells b. Digested Sludge. Decant Chamber	Passive 100	250 200
S. West Water Services Ltd	Camels Head, Plymouth	Sludge Tank	1000	50
S. West Water Services Ltd	Wembury, Devon	Sludge Tank	500	50
Severn Trent Water Ltd	Abermule STW, Powys	R.B.C. Works	75	10
Welsh Water	Clyne	Pumping Station	200	20
North West Water Ltd	Preston, Lancashire	a. Sludge Tanker Disch. Point & Fast Fill Sump b. Press Filtrate Wells c. Sludge Pump Wells	450 200 200	250 100 50
North West Water Ltd	Runcorn, Cheshire	Digested Sludge Decant Chamber	300	250
Anglian Water Services Ltd	Bromley, Essex	Works Inlet Well	200	10
Anglian Water Services Ltd	Bedford S.T.W.	a. PST Distribution Chambers b. Sludge Chambers c. Decant Liquor Well	100 300 200	200 300 250
Anglian Water Services Ltd	Colchester S.T.W.	Sludge Tank	200	500-750

The Colchester example will be discussed in detail later by my co-author James Mitchell of Anglian Water Services Limited.

However, at Bedford Sewage Treatment Works, the modular Peacemaker approach has been applied more cost effectively (in terms of capital installation costs and including 5 years maintenance) than Biofiltration to 5 separate odour sources across the site. **Table 4** shows these sources, typical odour levels generated and Peacemaker system installed.

Odour Source	Typical Odour Level ppm H ₂ S	Peacemaker System m ³ /hr - via
1. Primary Tank Distribution Chamber	25	2 No. 900 modules in parallel
2. Settled Sewage Flow Chamber	20	4 No. 900 modules in parallel
3. No. 1 Raw Sludge Pumping Chamber	>300	2 No. 900 modules in parallel
4. No. 2 Raw Sludge Pumping Chamber	>300	2 No. 900 modules in parallel
5. Decant Liquors Return Chamber	>200	2 No. 900 modules in parallel

continued overleaf >>>

Since its launch into the U.K. Waste Water Treatment Sector in January 1996, well over 50 installations have been completed and the Company has orders in hand for another 50 during the next 6 months.

The benefits of a modular approach, combined with the Peacemaker odour removal capabilities are fast becoming recognised as a new industry standard for odour control.

Colchester W.W.T.W; A Working Example

The 1990 Environment Protection Act, in tandem with our desire to exceed customer expectations, has persuaded Anglian Water to respond by making additional investment in odour treatment at some treatment sites. There is constant drive to find both preventative and control treatment strategies, that both satisfy our legal obligations and our customers. The use of the Peacemaker is increasingly becoming an important and useful way of reducing the odour problems experienced at some of our sites.

There are 7 No. installations using this technology across the Anglian Region, however, the installation at Colchester Wastewater Treatment Works has been chosen as the location for discussion.

History

In 1992, the anaerobic digestion capacity at Colchester was extended; as part of this, a 200m³ primary cosettled sludge holding tank was installed. The odour control on this tank consisted of an activated carbon unit on the waste air vent. The tank acts as a buffer tank between the main primary cosettled sludge tanks and the feed pumps to the new digester, providing 3 days storage of raw sludge at normal feed rates.

In 1997, a further anaerobic digester was constructed also taking its' primary cosettled sludge from this buffer tank. As part of the scheme, the decision was taken to replace the odour control unit with a more robust treatment option. The option chosen was that of the Peacemaker, which was installed and commissioned in September and is working efficiently.

Method of Operation of the Buffer Tank

The primary sludge is automatically pumped to the 3 No. original digesters and the buffer tank 18 times per day. The feed from the buffer tank is then controlled to each of the two new digesters via another set of pumps operated on an integrated timer regime. The volume of sludge pumped is set to maximise the treatment capacity of each of the digesters. Thus, the buffer tank is filled with between 8 and 11 m³ sludge per pumping cycle, depending on feed rate to the digesters and this volume is withdrawn on a feed cycle of 48 operations per day to the digesters. Thus, there is frequent regular movement of sludge within the buffer tank.

Design Criteria for Odour Control Unit

The effectiveness of other types of odour control units at Colchester has been variable. Thus, a very stringent set of criteria was needed for this location. It was imperative that a worse case scenario be used, due to some previous poor experiences, to ensure the control of odour. The data logging of aerial hydrogen sulphide in the sludge cycle over the last two years has indicated peaks of 500+ ppm whenever the sludge was disturbed.

The parameters that were set for performance of the odour control unit were:

Minimum 99% reduction of hydrogen sulphide with 18 peaks of 500 ppm per day.

Other Considerations

The land area available for siting the unit was also at premium and so a process with a small footprint was needed.

There was not a supply of final effluent washwater available within reasonable distance.

The buffer tank was within the 6m radius of special operations surrounding digestion plant and so intrinsically safe electrical equipment was stipulated.

The use of oxygen enriched methods of treatment were not appropriate at this location due to the close proximity to the digesters.

Options Considered (Table 5):

A range of options were considered and discarded:

Covering of the tank - already exists so no added value to considering this further.

Activated carbon and iodine enriched activated carbon was briefly reviewed, but was excluded due to high level of sulphides. The costs of operation and frequency of change of medium ruled this technology out of the considerations.

The use of Biofilters containing various mediums, such as peat and heather, coya fibre etc., were discounted due to the high peak sulphide levels. Also, the land footprint and washwater were not available. A secondary consideration was the ultimate disposal of the medium when it was sent after c.5 years.

A similar exercise was undertaken to investigate the viability of using calcified seaweed as a Biofilter medium. This showed promise in dealing with the high sulphide loads, however, it still had many of the problems of Biofilters already highlighted and was taken out of the considerations.

The use of Bioscrubbers, with and without secondary polishing were investigated. They were capable of dealing with higher loadings of sulphide than conventional Biofilters but were still inadequate to provide treatment for the design criteria.

All the above biological methods of treatment had, as a general guide rule, a limiting factor of 100 ppm sulphide peak loading for successful operation. This can be managed in certain circumstances by dilution with clean/less polluted sources, but not at this location.

The use of three wet stage scrubbing techniques were not considered beyond a very preliminary discussion. They were ruled out as being too expensive for this application, as well as requiring too large a footprint.

The Peacemaker system is a known technology with a proven track record. It had already been successfully used by the Works Manager elsewhere and the previous chairman of the Anglian Water Odour Practitioners Group supported their use. Thus it was considered for this location and it was able to be engineered to meet all the design criteria.

Table 5: Comparison Between Odour Control Systems for this Location

Technology	Peak Load Capacity	Footprint	Washwater Needed	Restricted Operational Demands	Health & Safety Implications
Biofilter Peat/Heather	1 - 2	1 - 2	1	10	10*
Biofilter Calcified Seaweed	3 - 4	1 - 2	1 - 2	10	10*
Bioscrubber	1 - 2	1 - 2	1 - 2	10	10
Bioscrubber & Biofilter	2 - 3	2 - 3	1 - 2	>10	10*
3 Stage Wet Scrubbing	10	3 - 4	not applicable	3 - 4	3 - 4
Oxygen Enriched Methods	1 - 10	1 - 10	1 - 10	not applicable	1 - 10
Covers Only	1	not applicable	not applicable	not applicable	1
Carbon Filters	1	1	not applicable	10	10*
Peacemaker	10	10	not applicable	10	10**

continued overleaf >>>

This is a comparative table to highlight the technologies against the key criteria. It is extremely difficult to do an exact cross comparison due to the number of variables in force. However, it is based on a sliding scale with 1 being the lowest and 10 being the highest rating e.g. carbon filters have a low effectiveness (1), but a very high ability to meet the restricted operational requirement near to digestion.

* means that the rating in normal operation is shown but when the medium has to be changed, this will change and become a lower rating during that operation.

** means the rating is high at all times, but the supplier has to take note of the special needs when he replenishes the active unit.

Results

The assessment of the unit has been undertaken on several occasions and these have always shown compliance with, and exceedence of the design criteria. (see Table 6.) In addition, assessment of mercaptans reduction has been shown that the unit effectively reduces these other odiferous compounds.

TABLE 6	Sample	Peacemaker Inlet		Peacemaker Outlet	
Date	Reading No.	Mercaptans ppm	H ₂ S ppm	Mercaptans ppm	H ₂ S ppm
Session 1 - 4/11/97	1	0	12	<0.1	0.0
	2	0.5	18	<0.1	0.0
	3	1.5	56	<0.1	0.0
	4	2.5	112	<0.1	0.0
	5	2	84	<0.1	0.0
	6	2	49	<0.1	0.0
Session 2 - 18/12/97	1	3.5	192	<0.1	0.0
	2	3	156	<0.1	0.0
	3	14	269	<0.1	0.0
	4	16	460	<0.1	0.2
	5	15	302	<0.1	0.1
	6	17	368	<0.1	0.1
Session 3 - 19/1/98	1	5	192	<0.1	0.0
	2	1.5	156	<0.1	0.0
	3	17	269	<0.1	0.0
	4	20	460	<0.1	0.2
	5	2	302	<0.1	0.0
	6	1	368	<0.1	0.0
Session 4 - 19/2/98	1	3	192	<0.1	0.0
	2	6	156	<0.1	0.0
	3	25	269	<0.1	0.5
	4	16	460	<0.1	0.3
	5	2	302	<0.1	0.0
	6	0	368	0	0.0

Notes

- Testing Equipment Used:
 - Hydrogen sulphide measurement via Crowcon Meter and Dräger Tubes.
 - Mercaptan measurement via Dräger Tubes.
- Samples/measurements taken at 15 minute intervals during each session.

Conclusion

The Peacemaker has proven to be the right technology and process for this location. It has achieved the design criteria and exceeded it and is continuing to effectively reduce the overall odour from the site.

Acknowledgments

The opinions expressed here are those of the author and are not in any way attributable to Anglian Water Services Ltd.

Our thanks to North West Water Ltd., Clifton Marsh W.W.T.W. Preston, for the use of performance data.

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preserving the environment

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Certificate No. 7174



APPENDIX III

THOLANDER COUNTER CURRENT SCRUBBER

FUNCTIONAL PRINCIPLES AND CHARACTERISTICS

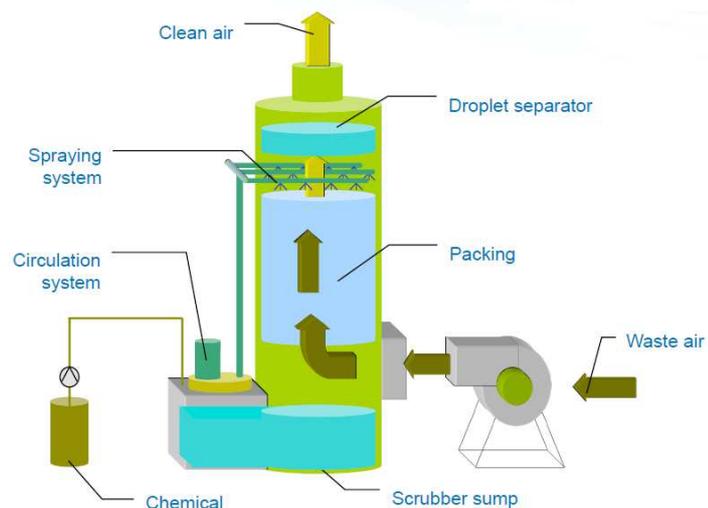


Counter-Current Scrubber

Counter-current scrubbers offer a cost-saving solution for “one-substance-problems”. The waste air is conducted from bottom to top “counter current” to the trickling scrubbing liquid through a filling material bed and leaves the scrubber at its head. Hereby a cleaning performance of 95 – 99 % is achieved.

Functional Principle

The scrubbing liquid flows from top to bottom through the scrubber packing into an imbedded sump. The gases to be scrubbed are conducted from bottom to top through the filling material (counter current). The application of the counter current principle leads to the highest scrubbing rates for toxic gases and odours. In this way more than 99 % of e.g. chlorine gas, ammonia and hydrochloric acid vapour can be removed. The high-performance filling material we use ensures an ideal material exchange at a low pressure drop. The special geometry and the alignment of the single filaments accelerate a constant split and new formation of the trickling scrubbing liquid drops. Depending on the type of contaminant acid, alkaline and/or oxidising scrubbing liquids are used. The chemicals are added automatically through pH-/RH-controlled dosing pumps. Depending on the medium the counter-current scrubbers can be made of fibre glass plastic or thermoplast. Typical applications are the separation of inorganic and organic acids (HCl, HF, SO₂, NO_x, acetic acid) as well as H₂S, ammonia and water-based organic combinations (acetone, alcohols and others).



Characteristics

- Air flow bottom to top
- High performance / high efficiency
- High cost savings due to low investment- and operation costs
- High flexibility at fluctuating raw gas contamination
- Ideal utilization of fresh water and chemicals applied
- Low space requirements / firm design
- Low pressure drop
- Corrosion- and weather resistance
- Low risk of clogging by selection of suitable filling material
- Clear and easy-to-maintain operation panel
- Can also be used as a bio scrubber

Application Examples

- Microelectronics
- Chemical industry, food industry
- Metal processing
- Composting
- Sewage plants
- Mechanical-biological waste treatment



APPENDIX IV BIOFILTER TECHNICAL SPECIFICATION

CLIENT :	PB Leiner UK
IN ATTENTION TO:	Douglas Francisquini Process Engineering Manager
ADRESS :	Unit A6, Severn Rd, Pontypridd CF37 5SQ, UK
CONTACTS :	Tel.+44 7824 349206 e-mail: douglas.francisquini@pbleiner.com
REFERENCE:	Gas, vapors and odor treatment system
POLLUTION SOURCE:	Gelatin factory with dispersed emissions, coming from the designated New farm sheds and from the Old farm for the storage and processing of Raw Material to be exhausted with the maintenance of negative pressures, considering a cleaning and depressurization of the environment with the removal and treatment of odors, at a rate of 4.4 and 6,5 changes of internal air /hour.
EQUIPMENT:	02 Biofilters with biological regeneration.
SUBJECT:	Offer P21102022
DATE:	21/10/2022

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1. SCOPE

This proposal aims to define the technical and commercial conditions for the production and the supply of one complete system to scrub and adsorb the gases, vapors, and odors, released in the gelatin manufacturing process, in two distinct areas comprising the internal gases of the storage and processing of the raw material, and which should receive a more located exhausting in the points of highest emission of contaminants, to improve better conditions in the working environment.

Since the inlet ventilation / dilution air will be defined by properly sized and positioned inlet grilles we ensure better hygiene of the internal side of the factory

Considering the preliminary data provided and based on the concentration measurements of the contaminants provided, which in principle will be similar to those at the Acorizal unit, one collection and joint treatment system with a unitary capacity of 56,000 m³/h will be considered for the New Farm unit and for the old farm unit.

As informed that during winter the two buildings receive an amount of hot air to be kept at at least 15 degrees with external temperatures near to 0 degrees, we will consider the option to reintroduce a part of the treated air coming out of our filters into the buildings to guarantee the required internal temperature and lower gas concentration.

These sectors, called New farm, contain a total volume of 23.462 m³, but an effective considered volume of 15.162 m³, that will receive an average of more less 4 air changes per hour to guarantee maximum hygiene, thermal comfort and mainly to promote depression (negative pressure) to prevent odors from released by the raw material and processes to escape to the external area, thus forcing all the gases contaminated with odors to be treated and deodorized before being released into the atmosphere, significantly improving working

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conditions and avoiding unwanted emissions in external areas and surroundings of the enterprise.

The same will be improved for the Old farm buildings that have 12.000 m³ of internal volume and a Free volume considered of 8.958 m³ that will receive an average of more less 6 air changes per hour to guarantee maximum hygiene and thermal comfort.

We consider the use of a vertical cartridge-type biological filter containing a mixture of Canadian peat and activated carbon, provided with a pre-scrubbing for the treatment of these captured contaminated gases, and having a continuous and biological regeneration, they operate with great advantages over traditional biological filters, thus increasing efficiency in the abatement of odors and reducing operating costs and required space for its installation.

These measures to be adopted will bring, as already mentioned, significant improvements in the work environment, will prevent odors and contaminants from escaping without proper treatment that would cause discomfort and embarrassment in other sectors of the company, its neighborhood and the environment and will add representative value of the company.

The high efficiency in the abatement of pollutants, associated with low operating costs, low noise level and great reliability of the systems, offered will exceed the requirements imposed for the ISO 14.000 qualification and will meet the new environmental law, eliminating the inconvenience caused to the neighborhood, and to the environment.

It represents a safe alternative for companies and entrepreneurs concerned with guaranteeing their results in the new millennium.

We now proceed to our technical and commercial proposals, placing ourselves at your entire disposal for any additional clarifications.

Yours sincerely

LUFTECHNIK IND.COM.DE EQUIPAMENTOS ANTIPOLUENTES LTDA

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2. CHARACTERISTICS OF POLLUTION SOURCES

2-1 Surface / volume of the New farm building

$$26,00 \times 56,4 = 1.466 \text{ m}^2 \times 2 = 2.932 \text{ m}^2 \dots \times 8,0(\text{ médium high}) \text{ Volume} = 23.462 \text{ m}^3$$

Volume used by the Liming Pits: $19,2 \times 50 \times 4,5 \times 2 = 8.640 \text{ m}^3$

Useful volume of air to be removed: $23,462 - 8,640 = 14,822 \text{ m}^3$

Air volume to be considered for the New farm: 15.162 m^3

With $56.000 \text{ m}^3/\text{h}$ of exhausting contaminated air we will have 3,7 air changes in the building but as considered a new kind of ventilation, in which we will introduce the reposition fresh air near the bottom and aspirating the contaminated air just over the middle of the Liming Pits, and considering a high of 3,5 m around the tanks where the people works, we will become a considered volume of 3.544 m^3 and an air changing rate of 15.8 /h that will guarantee a healthy and odor free environment around the Liming Pits and the contaminants will only have the exit grilles that takes the contaminated air to the Bio filter that eliminates there the contaminants.

2-2 Surface / volume of the Old farm building

$$11 \times 41 = 451 \text{ m}^2 \times 4 = 1.804 \text{ m}^2 \dots \times 6,65(\text{ médium high}) \text{ Volume} = 12.000 \text{ m}^3$$

Air volume to be considered for the Old farm: 8.958 m^3

- NH₃ (ppb) average = 15.000 considered
- H₂S (ppb) average = 8.000 considered
- VOC's (ppb) maximum= 1.000 considered

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3. Control system to be implemented (current) and its characteristics

Considered Equipment: 02 Vertical cartridge type biofilters model:KTFCA
56.000/2.400 with a capacity of 56.000 m³/h

5.1.-. TECHNICAL CHARACTERISTICS OF CARTRIDGE TYPE ACTIVATED CARBON BIOFILTER

5.1.1. Nominal Characteristics of each activated carbon bio filter.

Model:	KTFCA 56.000/2.400
Maximum Capacity: (m ³ /h)	56.000
Maximum Allowable Temperature at Inlet: °C	40
Average Temperature at Output: (°C)	30 ± 5
Maximum air speed at the inlet and outlet of the filter	10,0 ± 2,0
Velocity of gas transposition through the cartridge	0,41-0,59 m/s
Contaminant Removal Yield	97-99%
Loss of Load Introduced by Filter (mmca)	35± 5
Activated carbono volume	10,0m ³
Outside filter diameter	2.400
Total hight of the filter	7.000
Exhaust motor power (HP)	5 x 7,5
Removal ability before activated carbon saturation (Kg)	280-350
Total Installed power (HP)	37,5
Total Weight: (Kg)	4.200

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5.1.2.- Basic components of the activated carbon biofilter (with bio regeneration option)

- 01 structural external housing
- 01 structure in the form of a double cylinder containing the granulated activated carbon
- 01 inclined bottom for coal removal / mix CA Peat pellet
- 01 coal replacement tank with feeding nozzle
- 01 Tube axial exhauster
- 01 electrical panel

5.1.3.- Materials Used in the activated carbon filter

The structural modules of the filter are made with materials of high chemical and corrosion resistance, basically composed of GRP (glass fiber reinforced plastic) internally coated with a synthetic veil impregnated with ESTER-VINYL resin Derakane 411/45 from DOW QUÍMICA or RESAPOL 10 /500 from RESANA.

The internal structure in perforated sheet is made of duralumin or stainless-steel mesh.

Operational characteristics (inputs)

Installed power (CV): 5 x 7,5 CV (01 of the exhaust fans is reserve)

Water consumption: 1400 l/day for substrate wetting

Bioenhancers:

100 g/week Biotrat Microcat (Bioscience) (U\$ 20,00/kg).....5, 0 kg/year

50 g/week HX Bioscience (US\$ 150,00/kg)..... ..2.5 kg/year

3 kg/month of NPK Fertilizer (U\$ 3,00/Kg)..... ..36 kg/year

15-20 l/day of acetic acid to control the Ph..... 5,100 l/year (depends of the

Ammonia and H2S concentration

-If coal regeneration is not efficient,

replacement of1500 kg/year

(U\$ 1,00-1,50 / kg)

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2.5. SUPPLY LIMIT

2.5.1. Supply Proposed by Luftechnik

Luftechnik is responsible for providing the following equipment and services:

2.5.1.1. Preliminary design and specification of the system, including dimensioning of pipelines and captors, effluent and electrical network.

2.5.1.2. Equipment and Materials

2.5.1.2.1.01 biofilter

2.5.1.2.2. Motor pumps for nebulization, together with the hydraulic system and the atomizers.

2.5.1.2.3. Exhaust fan(s) of gases.

2.5.1.2.4. Interconnection materials from the control panel to the exhauster fans and pumps

2.5.1.2.5. Biofilter control panel and scrubbing system equipment.

2.5.1.2.6. Ducts for capturing gases from polluting sources to biological filters, including dampers, supports and sensors (has to be coted separately)

2.5.1.3. services

2.5.1.3.1. Assembly of the system.

2.5.1.3.2. Interconnection of the control panel to the Biofilter

2.5.1.3.3. System start up.

2.5.1.3.4. Supply of the operation manual.

2.5.1.3.5. The loading of the High cube 40' containers will be stuffed by our factory team

2.5.2. Supply at the expense of the CUSTOMER

The CLIENT is responsible for providing the following services:

2.5.2.1. Hydraulic installation for interconnecting the water network, neutralizing fluid and effluents from the CLIENT to the Biofilter.

2.5.2.2. Civil works, leveled base, Strauss drills or piles (if necessary), and support beams, for the installation of the Biofilter

2.5.2.3. Electrical installation to supply the gas washer control panel, along with its grounding.

2.5.2.4. Horizontal transport of the equipment near to the CLIENT's installation site.

2.5.2.5. Unloading, vertical and horizontal transport of the equipment to the installation site, within the CLIENT's facilities.

2.5.2.6. Crane services for 20 -30 hours, on behalf of the CUSTOMER. + 14 days Munk

2.5.2.7. Special medical examinations and additional requirements applied to labor on behalf of the CUSTOMER.

2.5.2.8. Transport from Luftechnik's facilities to the CLIENT's headquarters. (Ex-Works)

2.5.2.9. Transfer and accommodation of the assembler's team (14 days 04 technicians)

OBS.- It can be only two technicians from Brazil and two ones provided by you that speaks Portuguese, to reduce costs.

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2.6. GENERAL WARRANTY CONDITIONS

EQUIPMENT: KTM/KTM-LE and KTLF Series Gas Scrubbers biological filters and cartridge-type activated carbon filters KTFCA models

This warranty is intended to determine the technical responsibility for the operation and operation of the aforementioned equipment.

1st OPERATION WARRANTY

The equipment has a full warranty of 12 (twelve) months of operation, counted from the date of installation, covering all system components when operated under normal conditions of use.

This warranty does not cover damage caused by accidents, improper operations or alterations carried out without Lufftechnik's prior consent.

The basic structural components, such as: body, tank and fan housing, made of FRP (glass fiber reinforced plastic), are guaranteed for 05 (five) years.

Components such as pumps, atomizers and fan have an estimated lifespan of between 3 and 5 years.

2nd OPERATION GUARANTEE

We guarantee an efficiency of 94% in the neutralization of gases and odors for washers operating with neutralizing fluid according to CETESB recommendations (density < 1.15 Kg/l and Ph > 7.0) and provided that the emission source is operating normally.

We guarantee an efficiency of 93% in the retention of particles from 1 to 5 micron with the use of the KTM series and 98% in the retention of particles between 0.1 and 1 micron with the use of the LE series (electrostatics).

We guarantee an efficiency of 97 to 99% for activated carbon filters and biological filters with cartridge-shaped filter elements filled with adsorbent material.

3rd SPECIFICATION WARRANTY

In the event that the equipment does not meet the established needs and is not approved by Organs competent bodies, Lufftechnik will adjust the equipment by adding the modules that are necessary to achieve the desired efficiency, within a maximum period of 60 (sixty) days

IMPORTANT NOTE

In view of the great versatility and durability of the KTM and KTLF series gas scrubbers, its acquisition should be seen as an investment. However, if pollution control is no longer necessary, the equipment can be resold at any time for an excellent price. Lufftechnik undertakes to provide all technical and commercial support at the time.

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APPENDIX V CLIMATE CHANGE AGREEMENT



Climate Change Agreement - Data Collection Spreadsheet
Target Period 5 (2021-2022)



The purpose of this exercise is to collect energy and production data for 2022

How to use this spreadsheet: - Please enter data for each site in the **green boxes** within the 'Facility data' tabs
- Please return this spreadsheet complete with 2022 data to fdcca@slrconsulting.com by **24th February 2023**.

If the company or contact details listed below have changed, please contact the CCA helpdesk to provide updated information

Operator Name:

CCA Target Unit Reference Number:

Name of Administrative Contact:

Name of Responsible Person:

Administrative Contact Email:

Responsible Person Email:

Version: TP5 2022 v1_1

For SLR Use Only:

Data check (initials):

Okay to process?

Comments:



Climate Change Agreement - 2022 Facility Data Collection Spreadsheet - Energy and Production

Collection of 2022 calendar year energy and production data for CCA facilities within this agreement

Please enter data for this facility in the green boxes

CCA Target Unit Reference Number: FDF1/T00415

CHP SRM: No

Facility Reference Number:	FDF1/F00464
Facility Name:	P B Gelatins UK Ltd
Facility Address:	Unit A6 Severn Road Treforset Ind Estate Pontypridd CF37 5SQ
ETS Status:	Not in UK ETS
Facility CCA Status:	Approved

Facility CCA performance information:

	Base Year	2021	2022
Total production tonnes	5,842.00	5,906.94	5,835.72
Total primary energy (kWhp)	94,424,250	100,930,759	97,050,221
Performance (kWhp/tonne)	16,163.001	17,086.822	16,630.383
Carbon emissions (kg Ce)	4,861,100	5,255,016	5,028,650
CO2 emissions (tonnes CO2e)	17,824	19,268	18,438
CCL Discount (£)		£353,813	£418,453

1. 70/30 Status

Base Year
01 Jan 18 to 31 Dec 2018
Passed

Target Period 5	
1 Jan to 31 Dec 2021	1 Jan to 31 Dec 2022
Passed	Passed

2. Production Information

tonnes
5,842.00

tonnes	tonnes
5,906.94	5,835.72

3. Imported Energy from Utility Companies

	kWh
Electricity from the grid	8,693,787
Electricity from on site PV, wind, hydro	0
Natural Gas	721,080
Heavy Fuel Oil	0
Medium Fuel Oil	0
Gas Oil/Diesel	0
Coal	0
Propane/LPG	0
Kerosene	0
Renewable Fuel : <i>Name of fuel</i>	0
Other: <i>Name of fuel</i>	
Other: <i>Name of fuel</i>	

kWh	kWh	
9,092,495	8,820,201	
0		
1,731,080	1,413,640	
0		
0		
2,414,504	1,327,670	
0		
0		
0		
0		
0		Carbon factor (kgC/kWh)
0		
0		

4. Imported Energy Substitutes

	kWh
Liquid Nitrogen	0
Liquid CO2	0

kWh	kWh
0	
0	

5. Imported/Exported Energy from Other Sources

5.1 Imported

	kWh
Electricity	0
Natural Gas	71,099,324

kWh	kWh
0	
73,144,688	71,376,388

5.2 Exported

	kWh
Electricity	0
Natural Gas	0

kWh	kWh
0	
0	

7. Comments

Please use the comments box to provide an explanation for any unusual data or to advise of anything you feel might be relevant to your CCA submission

--	--

Climate Change Agreement - Conversion Factors

Energy Source	Conversion to Primary Energy (kWh primary / kWh delivered)	Conversion to kg Carbon equivalent (kgC _e / kWh primary)	Conversion to tonnes CO _{2e} (kgC _e / tonnes CO _{2e})
Electricity (from the grid)	2.6	0.0546	0.003667
Electricity (from renewables)	2.6	0.0546	0.003667
Natural Gas	1	0.0505	0.003667
Heavy Fuel Oil	1	0.0732	0.003667
Medium Fuel Oil	1	0.0732	0.003667
Gas Oil/Diesel	1	0.0758	0.003667
Coal	1	0.0794	0.003667
Propane/LPG	1	0.0585	0.003667
Kerosene	1	0.0673	0.003667
Diesel	1	0.0758	0.003667
Renewable fuel	1	0	0.000000
Liquid Nitrogen	2.6	0.0546	0.003667
Liquid CO ₂	2.6	0.0546	0.003667

You may only use these factors if your suppliers have not provided calorific values

Energy Source	Units	Conversion from units to kWh delivered
Natural Gas	<i>See gas bills</i>	
Heavy Fuel Oil	litres	11.4
Medium Fuel Oil	litres	11.3
Gas Oil/Diesel	litres	10.6
Coal	tonnes	8500
Propane (1)	kg	13.89
Propane (2)	litres	7.04
Kerosene	litres	10.33
Liquid Nitrogen (1)	tonnes	440
Liquid Nitrogen (2)	m ³	0.55
Liquid CO ₂ (1)	tonnes	203
Liquid CO ₂ (2)	m ³	0.375

Climate Change Agreement - Target Unit Performance Summary - Target Period 5

Target Unit Reference: FDF1/T00415

Target currency: Relative Energy
kWhp/tonne

Target Unit Company Name: P B Gelatins (UK) Ltd

Current no. of facilities in the Target Unit: 1
no. of facilities in BY: 1

	Base Year	Target Period 5 (2021-22)	
	Jan - Dec 2018	Jan - Dec 2021	Jan - Dec 2022
No. of facilities reporting data	1	1	1
Total production (tonnes)	5,842	5,907	5,836
Total primary energy (kWhp)	94,424,250	100,930,759	97,050,221
Performance (kWhp/tonne)	16,163.001	17,086.822	16,630.383
Carbon emissions (kg C _e)	4,861,100	5,255,016	5,028,650
CO ₂ emissions (tonnes CO _{2e})	17,824	19,268	18,438

Target Period 5 (2021-22)

Forecast Result

Target (% reduction)	8.469%
Target (kWhp/tonne)	14,794.185
Tolerance (+/-%)	0.016%
Tolerance (+/- kWhp/tonne)	2.826
Upper tolerance band (kWhp/tonne)	14,797.011
Lower tolerance band (kWhp/tonne)	14,791.359
Target Period Production (Tonnes)	11,743
Target Period Primary Energy (kWhp)	197,980,980
Target Period Carbon (kgC _e)	10,283,666
Target Period Performance (kWhp/tonne)	16,859.986
Percentage Saving since Base Year (%)	-4.312%
Target Period Result (pass/fail)	Fail
Target Period Result (tonnes CO _{2e})	4,614
CO₂ to buy-out (tonnes CO_{2e})	4614
Buy-out Cost (TP5 £18/tonne) (£)	£83,052
Estimated Value of CCL Discount during 2021/2022 (£)	£772,265
Estimated Value of CCL Discount for next certification period (£)*	£863,343

**Next certification period 01 Jul 2023 - 31 Mar 2025. Estimate based on 2022 fuel use and 2023 rates. If scheme is extended this may increase.*

APPENDIX VI MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

Version 9.0

Print Date 2017/07/13

Revision date / valid from 2017/07/13

MSDS code: **MCSS550**

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

1.1. Product identifier

Trade name : CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)
 Substance name : sodium hydroxide
 CAS-No. : 1310-73-2
 EC-No. : 215-185-5
 EU REACH-Reg. No. : 01-2119457892-27-xxxx

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

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.
 Uses advised against : At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company : Brenntag UK Limited
 Alpha House, Lawnswood Business Park
 GB LS16 6QY Leeds
 Telephone : +44 (0) 113 3879 200
 Telefax : +44 (0) 113 3879 280
 E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
 +44 (0) 1865 407333 (N.C.E.C. Culham)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1A	---	H314

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

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

Most important adverse effects

Human Health : See section 11 for toxicological information.
 Physical and chemical hazards : See section 9/10 for physicochemical information.
 Potential environmental effects : See section 12 for environmental information.

2.2. Label elements**Labelling according to Regulation (EC) No 1272/2008**

Hazard symbols : 

Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
 H314 Causes severe skin burns and eye damage.

Precautionary statements

Prevention : P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response : P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
 P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P390 Absorb spillage to prevent material damage.

Hazardous components which must be listed on the label:

- sodium hydroxide

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
sodium hydroxide			
Index-No. : 011-002-00-6	$\geq 2 - \leq 50$	Met. Corr.1	H290
CAS-No. : 1310-73-2		Skin Corr.1A	H314
EC-No. : 215-185-5			
EU REACH- : 01-2119457892-27-xxxx			
Reg. No.			

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

SECTION 4: First aid measures

4.1. Description of first aid measures

- General advice : Take off all contaminated clothing immediately.
- If inhaled : In case of accident by inhalation: remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.
- In case of skin contact : Wash off immediately with plenty of water. Call a physician immediately.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
- If swallowed : Rinse mouth with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately.

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

- Symptoms : See Section 11 for more detailed information on health effects and symptoms.
- Effects : Extremely corrosive and destructive to tissue. If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. See Section

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

11 for more detailed information on health effects and symptoms.

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

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures
5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
 Unsuitable extinguishing media : High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting : Incomplete combustion may form toxic pyrolysis products.
 Hazardous combustion products : Carbon monoxide, Carbon dioxide (CO₂), The formation of caustic fumes is possible.

5.3. Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)
 Specific extinguishing methods : Control smoke with water spray.
 Further advice : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures
6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Keep away unprotected persons. Use personal protective equipment. Ensure adequate ventilation. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material reaches soil inform authorities responsible for such cases.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up : Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

- : Use mechanical handling equipment. Keep in suitable, closed containers for disposal.
- Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

- See Section 1 for emergency contact information.
- See Section 8 for information on personal protective equipment.
- See Section 13 for waste treatment information.

SECTION 7: Handling and storage
7.1. Precautions for safe handling

- Advice on safe handling : Keep container tightly closed. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Use respirator with appropriate filter if vapours or aerosol are released. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
- Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : Store in original container.
- Advice on protection against fire and explosion : Normal measures for preventive fire protection.
- Further information on storage conditions : Keep tightly closed in a dry and cool place. Keep in a well-ventilated place.
- Advice on common storage : Keep away from food, drink and animal feedingstuffs. Acids
Light metals
- Suitable packaging materials : Stainless steel, Polyethylene, Polypropylene, Polyvinylchloride
- Unsuitable packaging materials : , Aluminium, Zinc, Copper

7.3. Specific end use(s)

- Specific use(s) : No information available.

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)**SECTION 8: Exposure controls/personal protection****8.1. Control parameters**

Component:	sodium hydroxide	CAS-No. 1310-73-2
-------------------	-------------------------	--------------------------

Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL

Workers, Long-term - local effects, Inhalation : 1.0 mg/m³

DNEL

Consumers, Long-term - local effects, Inhalation : 1.0 mg/m³

Predicted No Effect Concentration (PNEC)

No PNEC value was derived. :

Other Occupational Exposure Limit Values

UK. EH40 Workplace Exposure Limits (WELs), Short Term Exposure Limit (STEL):
2 mg/m³ELV (IE), Short Term Exposure Limit (STEL):
2 mg/m³**8.2. Exposure controls****Appropriate engineering controls**

Refer to protective measures listed in sections 7 and 8.

Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment*Respiratory protection*

Advice : In case of brief exposure or low pollution use breathing filter apparatus.
Respiratory protection complying with EN 141.
In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

Advice : Wear suitable gloves.
The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material : Natural Rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : polychloroprene
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Nitrile rubber
Break through time : ≥ 8 h
Glove thickness : 0.35 mm

Material : butyl-rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Fluorinated rubber
Break through time : ≥ 8 h
Glove thickness : 0.4 mm

Material : Polyvinylchloride
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Eye protection

Advice : Safety goggles
Face-shield

Skin and body protection

Advice : Impervious clothing
Chemical resistant apron

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
If the product contaminates rivers and lakes or drains inform respective authorities.
If material reaches soil inform authorities responsible for such cases.

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties**

Form	:	liquid
Colour	:	colourless
Odour	:	odourless
Odour Threshold	:	Not applicable
pH	:	ca. 14 (20 °C)
Melting point/range	:	-17 °C 10% solution 12 °C 50% solution
Boiling point/boiling range	:	105 °C 10% solution 145 °C 50% solution
Flash point	:	Not applicable
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	Not applicable
Lower explosion limit	:	Not applicable
Vapour pressure	:	21 hPa (20 °C) 12% solution
Relative vapour density	:	no data available
Density	:	ca. 1.0538 g/cm ³ (20 °C) 5% solution ca. 1.175 g/cm ³ (20 °C) 15% solution ca. 1.274 g/cm ³ (20 °C) 25% solution ca. 1.34 g/cm ³ (20 °C) 30% solution ca. 1.38 g/cm ³ (20 °C) 35% solution ca. 1.48 g/cm ³ (20 °C) 45% solution ca. 1.525 g/cm ³ (20 °C) 50% solution ca. 1.2191 g/cm ³ (20 °C) 20% solution
Water solubility	:	1090 g/l (20 °C)
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	no data available
Thermal decomposition	:	no data available
Viscosity, dynamic	:	79 mPa.s (20 °C)
Explosivity	:	Product is not explosive.

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

Oxidizing properties : no data available

9.2. Other information

Corrosion to metals : Corrosive to metals

SECTION 10: Stability and reactivity
10.1. Reactivity

Advice : No decomposition if stored and applied as directed.

10.2. Chemical stability

Advice : Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions : Corrosive in contact with metals Gives off hydrogen by reaction with base metals (zinc, aluminium). Reacts exothermically with water. Reacts exothermic with acids.

10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.

Thermal decomposition : no data available

10.5. Incompatible materials

Materials to avoid : Materials to avoid: Acids, Light metals, Alcohols, Halogenated hydrocarbon

10.6. Hazardous decomposition products

Hazardous decomposition products : hydrogen

SECTION 11: Toxicological information
11.1. Information on toxicological effects
Data for the product
Acute toxicity
Oral

Please find this information in the listing of the component/components below in this section.

Inhalation

no data available

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)**Dermal**

no data available

Irritation**Skin**

Result : Causes severe skin burns and eye damage.

Eyes

Result : Causes eye burns.

Sensitisation

no data available

CMR effects**CMR Properties**

Carcinogenicity : no data available

Mutagenicity : no data available

Reproductive toxicity : no data available

Specific Target Organ Toxicity**Single exposure**

no data available

Repeated exposure

no data available

Other toxic properties**Repeated dose toxicity**

no data available

Aspiration hazard

no data available

Component:**sodium hydroxide****CAS-No. 1310-73-2****Acute toxicity**

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)
Oral

No valid data available.

Inhalation

No valid data available.

Dermal

No valid data available.

Irritation
Skin

Result : Very corrosive (Rabbit) (No guideline followed)

Eyes

Result : Irritating to eyes. (Rabbit) (OECD Test Guideline 405)

Sensitisation

Result : not sensitizing (human) (No guideline followed) Patch test on human volunteers did not demonstrate sensitisation properties.

CMR effects
CMR Properties

Carcinogenicity : No experimental references for cancerogenity available.
 Mutagenicity : In vitro tests did not show mutagenic effects
 In vivo tests did not show mutagenic effects
 Teratogenicity : no data available
 Reproductive toxicity : Not expected to impair fertility.

Specific Target Organ Toxicity
Single exposure

Remarks : The substance or mixture is not classified as specific target organ toxicant, single exposure.

Repeated exposure

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

Remarks : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties**Aspiration hazard**

Not applicable,

SECTION 12: Ecological information**12.1. Toxicity****Data for the product****Acute toxicity****Acute aquatic toxicity**

Result : The product is not classified as dangerous for the environment.

Component: sodium hydroxide CAS-No. 1310-73-2

Acute toxicity**Fish**

LC50 : 125 mg/l (Gambusia affinis; 96 h) (No guideline followed)
 LC50 : 145 mg/l (Poecilia reticulata; 24 h) (No guideline followed)

Toxicity to daphnia and other aquatic invertebrates

EC50 : 40.4 mg/l (Ceriodaphnia (water flea); 48 h) (No guideline followed)

algae

: no data available

Bacteria

EC50 : 22 mg/l (Photobacterium phosphoreum; 15 min) (EPS 1/RM/24)

12.2. Persistence and degradability

Component: sodium hydroxide CAS-No. 1310-73-2

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)**Persistence and degradability****Persistence**

Result : no data available

Biodegradability

Result : The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Component: sodium hydroxide CAS-No. 1310-73-2

Bioaccumulation

Result : Does not bioaccumulate.

12.4. Mobility in soil

Component: sodium hydroxide CAS-No. 1310-73-2

Mobility

Water : The product is mobile in water environment.

12.5. Results of PBT and vPvB assessment**Data for the product****Results of PBT and vPvB assessment**

Result : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Component: sodium hydroxide CAS-No. 1310-73-2

Results of PBT and vPvB assessment

Result : The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.

12.6. Other adverse effects**Data for the product****Additional ecological information**

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Result : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
Harmful effects to aquatic organisms due to pH-shift.

Result :

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Additional ecological information
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Result : Harmful effects to aquatic organisms due to pH-shift.
Neutralization is normally necessary before waste water is discharged into water treatment plants.
Do not flush into surface water or sanitary sewer system.

SECTION 13: Disposal considerations
13.1. Waste treatment methods

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.

Contaminated packaging : Dispose of contaminated packaging in the same way as the product. In accordance with local and national regulations. Empty containers retain residue and can be dangerous.

European Waste Catalogue Number : No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information
14.1. UN number

1824

14.2. UN proper shipping name

ADR : SODIUM HYDROXIDE SOLUTION
RID : SODIUM HYDROXIDE SOLUTION
IMDG : SODIUM HYDROXIDE SOLUTION

14.3. Transport hazard class(es)

ADR-Class : 8
(Labels; Classification Code; Hazard identification No; Tunnel restriction code) 8; C5; 80; (E)
RID-Class : 8
(Labels; Classification Code; Hazard identification No) 8; C5; 80
IMDG-Class : 8

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(Labels; EmS)

8; F-A, S-B

14.4. Packaging group

ADR : II
 RID : II
 IMDG : II

14.5. Environmental hazards

Environmentally hazardous according to ADR : no
 Environmentally hazardous according to RID : no
 Marine Pollutant according to IMDG-Code : no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**
Data for the product

EU. REACH, Annex XVII, : Point Nos.: , 3; Listed
 Marketing and Use
 Restrictions (Regulation
 1907/2006/EC)

EU. Directive : ; The substance/mixture does not fall under this legislation.
 2012/18/EU (SEVESO
 III) Annex I

Component:	sodium hydroxide	CAS-No. 1310-73-2
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EU. Regulation EU No. : ; The substance/mixture does not fall under this legislation.
 649/2012 concerning the
 export and import of
 dangerous chemicals

EU. REACH, Annex XVII, : ; The substance/mixture does not fall under this legislation.
 Marketing and Use
 Restrictions (Regulation
 1907/2006/EC)

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EU. Regulation No : EC Number: , 215-185-5; Listed
1451/2007 [Biocides],
Annex I, OJ (L 325)

EU. Regulation No. : Maximum concentration in ready for use preparation: 2 %; Hair
1223/2009 on cosmetic straightener: General use; See the text of the regulation for
products, Annex III: List applicable exceptions or provisions.
of Restricted Substances
in Cosmetic Products

pH < 12,7.; pH adjuster for depilatories; See the text of the
regulation for applicable exceptions or provisions.

Maximum concentration in ready for use preparation: 4.5 %;
Hair straightener: Professional use; See the text of the
regulation for applicable exceptions or provisions.

pH < 11.; Uses as pH adjuster other than for depilatories; See
the text of the regulation for applicable exceptions or
provisions.

Maximum concentration in ready for use preparation: 5 %; Nail
cuticle solvent; See the text of the regulation for applicable
exceptions or provisions.

EU. Directive : ; The substance/mixture does not fall under this legislation.
2012/18/EU (SEVESO
III) Annex I

WGK (DE) : WGK 1: slightly water endangering: 142; Classification source
is Annex 2.

Component: sodium hypochlorite, solution CAS-No. 7681-52-9

Notification status**sodium hypochlorite, solution:**

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	231-668-3
ENCS (JP)	YES	(1)-237
IECSC	YES	
ISHL (JP)	YES	(1)-237
KECI (KR)	YES	KE-31506
NZIOC	YES	HSR003698
PICCS (PH)	YES	
TSCA	YES	

15.2. Chemical safety assessment

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no data available

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

H290 May be corrosive to metals.
 H314 Causes severe skin burns and eye damage.

Abbreviations and Acronyms

BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

Key literature references : Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were and sources for data

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	used to create this safety data sheet.
Methods used for product classification	: The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
Hints for trainings	: The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
Other information	: The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance - liquid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES035
2	Manufacture of substance - solid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES057
3	Industrial use	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15, 19, 23, 24	2, 4, 6a, 6b, 7	NA	ES065
4	Professional use	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 19, 23, 24	8a, 8b, 8d, 9a	NA	ES067
5	Consumer use	21	NA	20, 35, 39	NA	8a, 8b, 8d, 9a	NA	ES075

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1. Short title of Exposure Scenario 1: Manufacture of substance - liquid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
		Use closed systems or covering of open containers (e.g. screens) Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct

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	contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	<p>Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes.</p> <p>Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer.</p> <p>The employer has also to ascertain that the required PPE is available</p>	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	<p>In case of dust or aerosol formation: use respiratory protection with approved filter (P2)</p> <p>Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min</p> <p>wear tightly fitting safety goggles, face-shield</p> <p>Wear suitable protective clothing, aprons, shield and suits</p> <p>If splashes are likely to occur: Rubber or plastic boots</p>	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Modeled exposure data, very low vapour pressure, Without Local Exhaust Ventilation, without respiratory protection	Inhalation worker exposure	0.17mg/m ³	0.17
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.33mg/m ³	0.33
PROC1, PROC2, PROC3, PROC4,	Measured exposure data, worst-case	Worker - inhalative, long-term - local	0.14mg/m ³	0.14

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)PROC8a,
PROC8b,
PROC9

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 2: Manufacture of substance - solid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	<p>Use closed systems or covering of open containers (e.g. screens)</p> <p>Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)</p> <p>Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head)</p>	
Organisational measures to prevent /limit releases, dispersion	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed	

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and exposure	<p>processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available</p>	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	<p>In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits If splashes are likely to occur: Rubber or plastic boots</p>	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.01mg/m ³	0.01
PROC3, PROC9	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.1mg/m ³	0.1
PROC4, PROC8a	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.5mg/m ³	0.5
PROC9	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.26mg/m ³	0.26

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure

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to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.
Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 3: Industrial use

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature</p> <p>PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles</p>
Environmental Release Categories	<p>ERC2: Formulation of preparations</p> <p>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>ERC6b: Industrial use of reactive processing aids</p> <p>ERC7: Industrial use of substances in closed systems</p>

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6a, ERC6b, ERC7

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

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2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC19, PROC23, PROC24

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens) Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min If splashes are likely to occur: wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural

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soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m ³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m ³	---
PROC4, PROC5, PROC14	solid, no respiratory protection (RPE), With Local Exhaust Ventilation	Worker - inhalative, short-term - local	0.2mg/m ³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m ³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m ³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m ³	---

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

1. Short title of Exposure Scenario 4: Professional use

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature</p> <p>PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles</p>
Environmental Release Categories	<p>ERC8a: Wide dispersive indoor use of processing aids in open systems</p> <p>ERC8b: Wide dispersive indoor use of reactive substances in open systems</p> <p>ERC8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>ERC9a: Wide dispersive indoor use of substances in closed systems</p>

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Professional use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19, PROC23, PROC24

Product characteristics	Concentration of the	Covers percentage substance in the product up to
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CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

	Substance in Mixture/Article	100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Professional use
	Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head) Where possible use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Professional use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Professional use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min If splashes are likely to occur: wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/MWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m ³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m ³	---
PROC4, PROC5, PROC11, PROC14	solid, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.2mg/m ³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m ³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m ³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m ³	---

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

1. Short title of Exposure Scenario 5: Consumer use

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC20: Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents PC35: Washing and cleaning products (including solvent based products) PC39: Cosmetics, personal care products
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC9a: Wide dispersive indoor use of substances in closed systems
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	There are no specific risk management measures related to environment.	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility)., If container is empty, trash as regular municipal waste., Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility)., Recovery of the substance from alkaline batteries includes emptying the electrolyte, collection and neutralization.

2.2 Contributing scenario controlling consumer exposure for: PC20, PC35, PC39

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions. It is advisable to deliver only in very viscous preparations. It is advisable to delivery only in small amounts. For use in batteries, it is required to use completely sealed articles with a long service life maintenance. It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce

CAUSTIC SODA LIQUOR $\geq 2\%$ - $\leq 50\%$ (11-106 °TW)

		<p>the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. Do not apply product into ventilator openings or slots. Keep out of the reach of children.</p>
	Consumer Measures	<p>In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear impervious chemical resistant protective gloves. If splashes are likely to occur: wear tightly fitting safety goggles, face-shield</p>

3. Exposure estimation and reference to its source

Environment

Consumer uses relate to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.

Consumers

PC39, PC20, PC35: ConsExpo and SrayExpo

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC20, PC35, PC39	Assessed only for the most critical use, (use of the substance in a spray oven cleaner)	consumer inhalation, acute - local	0.3 - 1.6mg/m ³	< 1

The calculated short-term exposure is slightly higher than the long term DNEL for inhalation, but smaller than the short term occupational exposure limit. The substance will be rapidly neutralised as a result of its reaction with CO₂ (or other acids). Consumer exposure to the substance in batteries is zero because batteries are sealed articles with a long service life maintenance.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ConsEXpo software.
Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).



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PRODUCT SPECIFICATION

Product Name	Caustic Soda Liquor
Alternative Name	Sodium Hydroxide Solution 5 - 50%
Specification Reference	CS139/8 (18/12/(02)/IHSK)

SALES SPECIFICATION

PROPERTY	UNITS	SPECIFICATION RANGE	TYPICAL ANALYSIS
Sodium Hydroxide	% w/w NaOH	49 - 51	50
Sodium Carbonate	% w/w Na ₂ CO ₃	<0.1	0.03
Sodium Chloride	ppm NaCl	<100	<30
Sodium Sulphate	ppm Na ₂ SO ₄	<20	<5
Sodium Chlorate	ppm NaClO ₃	≤60	<20
Iron	ppm Fe	<5	1
Mercury	ppm Hg	<0.5	0.05

SODIUM HYDROXIDE LIQUOR - OTHER STRENGTHS

Specified % NaOH = +/- 1%

Examples

47% range = 46 - 48%

32% range = 31 - 33%

PLEASE NOTE TENNANTS CAUSTIC SODA MEETS TYPE 2 REQUIREMENTS OF BS EN 896: 2012

NOTES

Exclusion of Liability

Information contained in this publication is accurate to the best of the knowledge and belief of Tennants.

Any information or advice obtained from Tennants otherwise than by means of this publication and whether relating to Tennants materials or other materials, is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that Tennants materials are suitable for the particular purpose intended.

Tennants accepts no liability whatsoever (except as otherwise provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of Tennants materials or the use of Tennants materials in conjunction with such other materials.

Health and Safety

A Material Safety Data Sheet has been issued describing the health, safety and environmental properties of this product, identifying the potential hazards and giving advice on the handling precautions and emergency procedures. This must be consulted fully before handling, storage and use.



SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

1.1 Product Identifier

GHS Product Identifier	Caustic Soda Liquor
EC Index Number	011-002-00-6
Alternative Name	Sodium Hydroxide Solution
HMRC Commodity Code	28151200
REACH Registration Number	01-2119457892-27-XXXX

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

Use of the Substance/Mixture

Chemical manufacture and processing. pH control.

Recommended restrictions on use

None anticipated

1.3 Details of the supplier of the safety data sheet

Tennants Distribution Limited
Hazelbottom Road
Cheetham
Manchester
M8 0GR
Tel: 44(0)161 205 4454
Fax: 44(0) 161 203 4298
Email: msds@tennantsdistribution.com

1.4 Emergency telephone number

Tel: 44(0)844 335 0001 (24 hours)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Skin Corr. 1A Met. Corr. 1

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

2.2. Label Elements

Hazard Statements

H314: Causes severe skin burns and eye damage.

H290: May be corrosive to metal

Signal word(s) DANGER

Hazard Pictogram



Precautionary statement(s)

P260: Do not breathe dust/fume/gas/mist/vapours/spray.

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

P301+P330+P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

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

P310: Immediately call a POISON CENTER or doctor/physician.

2.3 Other hazards

This data sheet covers solutions containing greater than 5% caustic soda (sodium hydroxide), rayon and membrane grades.

Rayon grades contain typically less than 0.1mg/kg mercury.



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3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Hazardous ingredient(s)	%(w/w)	CAS No.	EC No.	H - Codes	GHS Classification
Sodium Hydroxide	10 - 75	001310-73-2	215-185-5	H314, H290	Skin Corr. 1A Met. Corr. 1

This data sheet covers solutions containing greater than 5% caustic soda (sodium hydroxide), rayon and membrane grades.

Rayon grades contain typically less than 0.1mg/kg mercury.

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled

Remove patient from exposure, keep warm and at rest. Administer oxygen if necessary

In case of skin contact

Remove contaminated clothing. Drench with large quantities of water. Continue to wash the affected area for at least 10 minutes

In case of eye contact

Immediately irrigate with eyewash solution nor clean water, holding the eyelids apart, for at least 15 minutes. Continue irrigation until medical attention can be obtained

If swallowed

Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200 – 300 ml (half a pint) of water to drink

4.2 Most important symptoms and effects, both acute and delayed

Causes severe damage to eyes and skin. May cause severe damage with formation of corneal ulcers and permanent impairment of vision. Mist is severely irritant to the respiratory tract. Effect may vary from irritation of the nasal mucous membrane to severe lung irritation. Will immediately cause corrosion of and damage to the gastrointestinal tract.

4.3 Indication of any immediate medical attention and special treatment needed

SPEED IS ESSENTIAL. OBTAIN IMMEDIATE MEDICAL ATTENTION.

Showers and eye washing equipment must be provided at handling points.

Remove contaminated clothing and wash all affected areas with plenty of water.

Symptomatic treatment and supportive therapy as indicated.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Foam, CO₂ or dry powder. As appropriate for surrounding fire.

Unsuitable extinguishing media

No further information

5.2 Special hazards arising from the substance or mixture

Non-combustible. Exothermic reaction with water. Contact with some metals e.g. aluminium, zinc can produce flammable hydrogen gas. Contact with some organic chemicals can produce violent or explosive reactions.

5.3 Advice for fire-fighters

Special protective equipment for fire-fighters

A self-contained breathing apparatus and suitable protective clothing must be worn in fire conditions.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions

Ensure suitable personal protection during removal of spillages.

6.2 Environmental precautions

Environmental precautions

Stop leak if safe to do so. Contain spillages.

Small spillages: Neutralise wherever possible. Wash the spillage area with water.

Large spillages: Contain spillages with sand, earth or any suitable adsorbent material. Remove and dispose of residues.

Wash the spillage area with water. Water washing to drain of large amounts of caustic soda should only be carried out with the prior consent of the Environment Agency or other appropriate regulatory body.

Contaminated adsorbent must be removed in sealed, plastic lined drums and disposed of via an authorised waste disposal contractor.

6.3 Methods and materials for containment and cleaning up

Methods and material for containment and cleaning up



PRODUCT: CAUSTIC SODA LIQUOR (CSL) REVISION:9 DATED: 14/12/18 PAGE 4 OF 7

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.

Further information

Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environment Agency or other appropriate regulatory body.

6.4 Reference to other sections

See Section 8 for information on personal protective equipment.

See Section 13 for waste treatment information.

6.5 Additional Information

Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environment Agency or other appropriate regulatory body.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling

Avoid contact with skin and eyes. Keep away from acids and chlorinated hydrocarbons.

Care should be taken when diluting solutions. Do not spray. Avoid generation of aerosols or mist.

Rayon grades only: For operations involving black sludge containing mercury, atmospheric levels of mercury must be controlled in compliance with the occupational exposure limit (see 7.2).

Hygiene measures

Keep away from food, drink and animal feeding stuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers

For small quantities - Keep container tightly closed.

For large quantities - Can be stored at normal or slightly elevated temperatures in mild steel tanks. Where temperature is above 40 Deg C for liquors containing 30% or more of caustic or above 60 Deg C for lower concentrations tanks must be stressed relieved.

Following prolonged storage in mild steel tanks, a black sludge will collect at the bottom of the tank. The sludge will contain iron, sodium carbonate and when Rayon grades are stored, mercury. In the latter case the mercury is likely to be present in a finely divided form, spread throughout the particulate matter in the sludge. Provision should be made for testing the tank atmosphere for oxygen and mercury prior to entry.

7.3 Specific end uses

Specific use(s)

No information available.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

HAZARDOUS INGREDIENT(S)	CAS No.	LTEL 8 hr TWA ppm	LTEL 8 hr TWA mg/m3	STEL ppm	STEL mg/m3	Note:
Sodium Hydroxide	001310-73-2	-	-	-	2	WEL
Mercury & its inorganic divalent compounds		-	0.02	-	-	IOELV, Sk

DNEL/DMEL	Oral	Inhalation	Dermal
Industry - Long Term - Local effects	-	1.0 mg/m ³	-
Industry - Long Term - Systemic effects	-	-	-
Industry - Short term - Local effects	-	-	2%
Industry - Short term - Systemic effects	-	-	-
Consumer. - Long Term - Local effects	-	1.0 mg/m ³	-
Consumer. - Long Term - Systemic effects	-	-	-
Consumer. - Short term - Local effects	-	-	2%
Consumer. - Short term - Systemic effects	-	-	-

Environment	PNEC
Aquatic Compartment (including sediment)	Not relevant for this material.
Terrestrial Compartment	Not relevant for this material.
Atmospheric Compartment	Not relevant for this material.

8.2 Exposure Controls

Appropriate Engineering Controls



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Provide adequate ventilation, including appropriate local extraction, if fumes or vapours are likely to be evolved.

Personal Protection

Eye/face protection

Wear close fitting goggles or full face shield.

Skin protection

Wear suitable protective clothing and gloves.

Suitable Materials: PVC, Neoprene, natural rubber

Unsuitable gloves materials: Leather

Leather footwear is not suitable.

Check with protective equipment manufacturer's data.

Respiratory protection

Wear suitable respiratory protective equipment if exposure to levels above the occupational exposure limit is likely.

Use a respirator/filter with at least: Filter type P2

Rayon grades only: For operations involving black sludge containing mercury, air line fed breathing apparatus must be worn (see 7.2).

Check with protective equipment manufacturer's data.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Molecular weight: 40

Form Clear or slightly turbid liquid.

Colour colourless

Solubility (Water) soluble (100g NaOH/100g H₂O at 25°C)

Solubility (Other) ethanol

9.2 Other information

No further information available.

10 STABILITY AND REACTIVITY

10.1 Reactivity

Highly reactive with aluminium, zinc, tin and alloys of these metals producing flammable hydrogen gas. Contact with some organic chemicals can produce violent or explosive reactions.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Can react violently if in contact with acids and chlorinated hydrocarbons. Exothermic reaction with water.

Can react with sugar residues to form carbon monoxide.

10.4 Conditions to avoid

If electric arc welding or cutting, particular attention must be paid to the way the circuit is completed to eliminate the possibility of electrolysis of liquor producing hydrogen.

10.5 Incompatible materials

Keep away from: Acids, ammonia solution, chlorinated hydrocarbons

10.6 Hazardous decomposition products

hydrogen

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Acute Oral Toxicity

Will immediately cause corrosion of and damage to the gastrointestinal tract.

Lethal dose for man is approximately 5g.

Acute Inhalation Toxicity

Mist is severely irritant to the respiratory tract. Effect may vary from irritation of the nasal mucous membrane to severe lung irritation.

Acute Dermal Toxicity

Corrosive. May cause severe burns with permanent skin damage which are slow to heal. Repeated or prolonged contact to dilute solutions may cause dermatitis

Irritation Skin

Causes severe skin burns.

Serious Eye Damage/Irritation

Causes serious eye damage. May cause severe damage with formation of corneal ulcers and permanent impairment of vision.

Respiratory Irritation



PRODUCT: CAUSTIC SODA LIQUOR (CSL) REVISION:9 DATED: 14/12/18 PAGE 6 OF 7

Mist is severely irritant to the respiratory tract. Effect may vary from irritation of the nasal mucous membrane to severe lung irritation

Sensitisation

Respiratory system: No data.

There is no evidence of skin sensitisation in humans.

Repeated Dose Toxicity

No reliable data available.

Germ Cell Mutagenicity

There is no evidence of mutagenic potential. The material did not induce mutagenicity in in-vitro or in-vivo studies.

Carcinogenicity

Sodium hydroxide is corrosive to the skin and respiratory tract and will not be systemically available in the body under normal conditions of handling and use. As a consequence it is not expected to cause cancer in any organ

Reproductive Toxicity

Sodium hydroxide will not be systemically available in the body under normal conditions of handling and use and will not be toxic to the reproductive system or the developing foetus.

Specific target organ toxicity — single exposure (STOT SE): Not classified

Specific target organ toxicity — repeated exposure (STOT RE): Not classified

Aspiration Hazard

Not an aspiration hazard

Further information

None

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No reliable data available. Concentrations greater than 10ppm, especially in fresh water, or a pH value equal to or greater than 10.5 may be fatal to fish and other aquatic organisms. Can cause damage to aquatic plants. Can cause damage to vegetation.

12.2 Persistence and degradability

Sodium hydroxide is highly soluble in water and has a low vapour pressure. It will be found predominantly in the aquatic environment. It degrades readily by reaction with the natural carbon dioxide in the air.

12.3 Bioaccumulative potential

Sodium hydroxide does not bioaccumulate.

12.4 Mobility in soil

Sodium hydroxide becomes increasingly more mobile in soil with dilution.

12.5 Results of PBT and vPvB assessment

Sodium hydroxide does not meet the criteria for persistency, bioaccumulation and toxicity. (EU RAR 2007)

12.6 Other adverse effects

Concentrations sufficient to render effluent alkaline may cause damage to effluent treatment organisms.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Disposal should be in accordance with local, state or national legislation.

Do not empty into drains; dispose of this material and its container in a safe way.

Contaminated adsorbent must be removed in sealed, plastic lined drums and disposed of via an authorised waste disposal contractor.

Additional Information

Sludge waste containing mercury (see Storage) will require to be disposed of in an authorised treatment facility licenced under the Environmental Protection Act (EPA).

14. TRANSPORT INFORMATION

14.1 Road/Rail

UN No.	1824
Proper Shipping Name	SODIUM HYDROXIDE SOLUTION
ADR/RID Class	8
Packing Group	II
Label.	8
Tunnel Restriction Code	(E)

14.2 Sea

UN No.	1824
Proper Shipping Name	SODIUM HYDROXIDE SOLUTION
IMDG Class	8
Packing Group	II



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Label.	8
Marine Pollutant	Not classified as a Marine Pollutant
14.3 Air (ICAO/IATA)	
UN No.	1824
Proper Shipping Name	SODIUM HYDROXIDE SOLUTION
ICAO-TI Class	8
Packing Group	II
Label.	8
14.4 Additional Information	
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	
Product Name: Sodium hydroxide solution.	
Ship Type: 3	
Pollution Category: Y	

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Control of Substances Hazardous to Health Regulations (COSHH) 2002 SI 2002/2677 and COSHH Essentials: Easy steps to control chemicals - Control of Substances Hazardous to Health Regulations HSG193. Wassergefährdungsklasse (Germany) WGK class 1 (official).

Inventory Status
Listed in: Australia (AICS), Canada (DSL/NDSL), China (IECSC), European Union (EINECS/ELINCS), South Korea (KECI), Philippines (PICCS), New Zealand Inventory (NZIoC), Switzerland United States (TSCA).

15.2 Chemical Safety Assessment
A Chemical Safety Assessment (CSA) has been completed for this substance.

16. OTHER INFORMATION

LEGEND

WEL : Workplace Exposure Limit (UK HSE EH40)
COM : The company aims to control exposure in its workplace to this limit
TLV : The company aims to control exposure in its workplace to the ACGIH limit
TLV-C: The company aims to control exposure in its workplace to the ACGIH Ceiling limit
MAK : The company aims to control exposure in its workplace to the German limit
Sk : Can be absorbed through skin
Sen : Capable of causing respiratory sensitisation
Bmgv : Biological monitoring guidance value (UK HSE EH40)
ILV : Indicative Limit Value (UK HSE EH40)
IOELV: Indicative Occupational Exposure Limit Value
PBT Persistent, Bioaccumulative and Toxic
vPvB very Persistent very Bioaccumulative
Key literature references
EU RAR NaOH (2007), European Union Risk Assessment Report sodium hydroxide. Office for Official Publications of the European Union. Luxembourg.
GESTIS - database on hazardous substances
Chemical Safety Report, Sodium Hydroxide (21 July 2010)
Full text of H-Statements referred to under sections 2 and 3.
H314 Causes severe skin burns and eye damage.
Modification since last revision
The Specification has been updated. The Safety Data Sheet remains the same
Revision Date: 14/12/18
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ANNEX TO SAFETY DATA SHEET: SODIUM HYDROXIDE

Exposure Scenario 1: Manufacturing of liquid NaOH

List of all use descriptors

Sector of use (SU):	SU 3, 8 Manufacture of bulk, large-scale substances
Product category (PC):	not applicable
Process category (PROC):	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities PROC9 Transfer of chemicals into small containers (dedicated filling line)
Article category (AC):	not applicable
Environmental Release	
Category (ERC):	ERC1 Manufacture of substances

EU Risk Assessment

An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristics

Liquid NaOH, all concentrations

Frequency and duration of use

Continuous

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

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment or recovery of waste for disposal

Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

Contributing exposure scenario controlling worker exposure

Product characteristic

Liquid NaOH, all concentrations

Frequency and duration of use/exposure

8 hours/day, 200 days/year

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

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)"

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

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions

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

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves
 - o material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >

ANNEX TO SAFETY DATA SHEET: SODIUM HYDROXIDE

<p>480 min</p> <ul style="list-style-type: none">○ material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min <ul style="list-style-type: none">• Eye protection: chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, face - shield• Wear suitable protective clothing, aprons, shield and suits, if splashes are likely to occur, wear: rubber or plastic boots, rubber or plastic boots
<p>Exposure estimation and reference to its source</p>
<p>Worker exposure:</p> <p>NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.</p> <p>NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.</p> <p>Based on NaOH measurements and following the proposed risk management measures controlling worker exposure, the reasonable worst-case inhalation exposure of 0.33 mg/m (typical value is 0.14 mg/m³) is below the DNEL of 1 mg/m³.</p> <p>Environmental exposure:</p> <p>The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the Na⁺ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.</p> <p>The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.</p> <p>Significant emissions to air are not expected due to the very low vapour pressure of NaOH. If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).</p> <p>Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase.</p> <p>Bioaccumulation will not occur.</p>

ANNEX TO SAFETY DATA SHEET: SODIUM HYDROXIDE

Exposure Scenario 2: Manufacturing of solid NaOH

List of all use descriptors

Sector of use (SU):	SU 3, 8 Manufacture of bulk, large-scale substances
Product category (PC):	not applicable
Process category (PROC):	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities PROC9 Transfer of chemicals into small containers (dedicated filling line)
Article category (AC):	not applicable
Environmental Release	
Category (ERC):	ERC1 Manufacture of substances

EU Risk Assessment

An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristics

Solid NaOH

Frequency and duration of use

Continuous

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

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment or recovery of waste for disposal

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

Contributing exposure scenario controlling worker exposure

Product characteristic

Solid NaOH, all concentrations

Frequency and duration of use/exposure

8 hours/day, 200 days/year

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

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)"

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

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions

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

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves

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- material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min
- material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min
- Eye protection: chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, face - shield
- Wear suitable protective clothing, aprons, shield and suits, if splashes are likely to occur, wear: rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source

Worker exposure:

NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.

NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

Based on NaOH measurements and following the proposed risk management measures controlling worker exposure, the reasonable worst-case inhalation exposure of 0.26 mg/m³ (measured at the drumming/bagging place) is below the DNEL of 1 mg/m³.

Environmental exposure:

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the Na⁺ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.

Significant emissions to air are not expected due to the very low vapour pressure of NaOH. If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase.

Bioaccumulation will not occur.

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Exposure Scenario 3: Industrial and Professional Use of NaOH

List of all use descriptors

Sector of use (SU): SU 1-24

Because sodium hydroxide has so many uses and is used so widely it can potentially be used in all sectors of end use (SU) described by the use descriptor system (SU 1-24). NaOH is used for different purposes in a variety of industrial sectors.

Product category (PC): PC 0-40

Sodium hydroxide can be used in many different chemical product categories (PC). It can be used for example as an adsorbent (PC2), metal surface treatment product (PC14), non-metal-surface treatment product (PC15), intermediate (PC19), pH regulator (PC20), laboratory chemical (PC21), cleaning product (PC35), water softener (PC36), water treatment chemical (PC37) or extraction agent. However, it could potentially also be used in other chemical product categories (PC 0 - 40).

Process category (PROC): PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 Mixing or blending in batch processes (multistage and/or significant contact)
PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities
PROC9 Transfer of chemicals into small containers (dedicated filling line)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC15 Use of laboratory reagents in small scale laboratories

The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC 1 - 27).

Article category (AC): not applicable

Although sodium hydroxide can be used during the manufacturing process of articles, the substance is not expected to be present in the article. The article categories (AC) do not seem applicable for sodium hydroxide.

Environmental Release

Category (ERC): ERC1 Manufacture of substances
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6A Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6B Industrial use of reactive processing aids
ERC7 Industrial use of substances in closed systems
ERC8A Wide dispersive indoor use of processing aids in open systems
ERC8B Wide dispersive indoor use of reactive substances in open systems
ERC8D Wide dispersive outdoor use of processing aids in open systems
ERC9A Wide dispersive indoor use of substances in closed systems

The environmental release categories mentioned above are assumed to be the most important ones but other industrial environmental release categories could also be possible (ERC 1 - 12).

Further explanations

Typical uses include: production of organic and inorganic chemicals, formulation of chemicals, production and whitening of paper pulp, production of aluminium and other metals, food industry, water treatment, production of textiles, professional end use of formulated products and other industrial uses.

EU Risk Assessment

An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristics

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class

Frequency and duration of use

Continuous

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

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment or recovery of waste for disposal

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

Contributing exposure scenario controlling worker exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class

Frequency and duration of use/exposure

8 hours/day, 200 days/year

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

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)"

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

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

For worker, both solid and liquid NaOH containing products at concentration > 2%:

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions
- Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.

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

For worker and professional, both solid and liquid NaOH containing products at concentration > 2%:

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves
 - material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min
 - material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face -shield
- If splashes are likely to occur, wear suitable protective clothing, aprons, shield and suits, rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source

Worker/professional exposure:

NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.

NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

Based on NaOH measurements in the pulp and paper industry, de-inking waste paper, aluminium, textile and chemical industry and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL of 1 mg/m³.

In addition to the measured exposure data the ECETOC TRA tool has been used to estimate the inhalation exposure (see Table below). It was assumed that there is no local exhaust ventilation and no respiratory protection unless specified otherwise. The duration of exposure was set at more than 4 hours per day as a worst-case assumption and professional use was specified where relevant as

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a worst-case assumption. For the solid, the low dustiness class was selected because NaOH is very hygroscopic. Only the most relevant PROCs were considered in the assessment.

PROC	PROC description	Liquid (mg/m ³)	Solid (mg/m ³)
PROC 1	Use in closed process, no likelihood of exposure	0.17	0.01
PROC 2	Use in closed, continuous process with occasional controlled exposure (e.g. sampling)	0.17	0.01
PROC 3	Use in closed batch process (synthesis or formulation)	0.17	0.1
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	0.17	0.2 (with LEV)
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	0.17	0.2 (with LEV)
PROC 7	Spraying in industrial settings and applications	0.17	Not applicable
PROC 8a/b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated or dedicated facilities	0.17	0.5
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0.17	0.5
PROC10	Roller application or brushing of adhesive and other coating	0.17	0.5
PROC11	Spraying outside industrial settings or applications	0.17	0.2 (with LEV)
PROC13	Treatment of articles by dipping and pouring	0.17	0.5
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelettisation	0.17	0.2 (with LEV)
PROC15	Use a laboratory reagent	0.17	0.1
PROC19	Hand-mixing with intimate contact and only PPE available.	0.17	0.5
PROC23	Open processing and transfer operations (with minerals) at elevated temperature	0.17	0.4 (with LEV and RPE(90%))
PROC24	High (mechanical) energy work-up of substances bound in materials and/or articles	0.17	0.5 (with LEV and RPE(90%))

Environmental exposure:

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the Na⁺ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.

Significant emissions to air are not expected due to the very low vapour pressure of NaOH. If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase.

Bioaccumulation will not occur.

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Exposure Scenario 4: Consumer Use of NaOH	
<i>List of all use descriptors</i>	
Sector of use (SU):	SU 21 Private households
Product category (PC):	PC 0-40
Sodium hydroxide can be used in many different chemical product categories (PC): PC 20, 35, 39 (neutralisation agents, cleaning products, cosmetics, personal care products). The other PCs are not explicitly considered in this exposure scenario. However, NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40).	
Process category (PROC):	not applicable
Article category (AC):	not applicable
Environmental Release	
Category (ERC):	ERC8A Wide dispersive indoor use of processing aids in open systems ERC8B Wide dispersive indoor use of reactive substances in open systems ERC8D Wide dispersive outdoor use of processing aids in open systems ERC9A Wide dispersive indoor use of substances in closed systems
The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC 8 - 11b).	
<i>Further explanations</i>	
NaOH (up to 100%) is also used by consumers. It is used at home for drain and pipe cleaning, wood treatment and it also used to make soap at home. NaOH is also used in batteries and in oven-cleaner pads.	
<i>EU Risk Assessment</i>	
An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet: http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf	
Contributing exposure scenario controlling environmental exposure	
Product characteristics	
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class	
Conditions and measures related to external treatment or recovery of waste for disposal	
This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). If container is empty, trash as regular municipal waste. Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of NaOH from alkaline batteries includes emptying the electrolyte, collection and neutralization with sulphuric acid and carbon dioxide.	
Contributing exposure scenario controlling worker exposure	
Product characteristic	
Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class Typical concentrations: floor strippers (<10%), hair straighteners (<2%), oven cleaners (<5%), drain openers (liquid: 30%, solid: <100%), cleaning products (<1.1%)	
Conditions and measures related to the design of the product	
<ul style="list-style-type: none"> It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions. It is required that household chemicals, containing sodium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society. It is advisable to deliver only in very viscous preparations It is advisable to delivery only in small amounts For use in batteries, it is required to use completely sealed articles with a long service life maintenance. 	
Conditions and measures related to information and behavioural advice to consumers	
It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of	

ANNEX TO SAFETY DATA SHEET: SODIUM HYDROXIDE

<p>sodium hydroxide, instructions for use should contain a warning against dangerous mixtures.</p> <p>Instructions addressed to consumers:</p> <ul style="list-style-type: none">• Keep out of reach of children.• Do not apply product into ventilator openings or slots.
<p>Conditions and measures related to personal protection and hygiene</p> <p>For consumer, both solid and liquid NaOH containing products at concentration > 2%:</p> <ul style="list-style-type: none">• Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)• Hand protection: impervious chemical resistant protective gloves• If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face-shield
<p>Exposure estimation and reference to its source</p> <p>Consumer exposure: Acute/short term exposure was assessed only for the most critical use: use of NaOH in a spray oven cleaner. Consexpo and SprayExpo were used to estimate exposure. The calculated short-term exposure of 0.3 - 1.6 mg/m³ is slightly higher than the long term DNEL for inhalation of 1 mg/m³ but smaller than the short term occupational exposure limit of 2 mg/m³. Furthermore, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).</p> <p>Environmental exposure: Consumer uses relates to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.</p>

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

Hydrochloric Acid 25% - 36%

Version 6.0

Print Date 2013/07/23

Revision date / valid from 2013/07/23

MSDS code: MHCL100

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

1.1. Product identifier

Trade name : Hydrochloric Acid 25% - 36%
 Substance name : hydrochloric acid
 Index-No. : 017-002-01-X
 CAS-No. : 7647-01-0
 EC-No. : 231-595-7
 Registration number : 01-2119484862-27-xxxx

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

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.

Uses advised against : Food additive

1.3. Details of the supplier of the safety data sheet

Company : Brenntag UK & Ireland
 Albion House, Rawdon Park
 GB LS19 7XX Leeds Yeadon
 Telephone : +44 (0) 113 3879 200
 Telefax : +44 (0) 113 3879 280
 E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
 +44 (0) 1865 407333 (N.C.E.C. Culham)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1B	---	H314

Hydrochloric Acid 25% - 36%

Specific target organ toxicity - single exposure	Category 3	---	H335
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For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Directive 67/548/EEC or 1999/45/EC	
Hazard symbol / Category of danger	Risk phrases
Corrosive (C)	R34
Irritant (Xi)	R37

For the full text of the R-phrases mentioned in this Section, see Section 16.

Most important adverse effects

Human Health	:	See section 11 for toxicological information.
Physical and chemical hazards	:	See section 9 for physicochemical information.
Potential environmental effects	:	See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols	:	 
Signal word	:	Danger
Hazard statements	:	H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage. H335 May cause respiratory irritation.
Precautionary statements	:	
Prevention	:	P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	:	P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower. P304 + P340 IF INHALED: Remove victim to 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

Hydrochloric Acid 25% - 36%

P308
P310

lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned:
Immediately call a POISON CENTER or doctor/ physician.

Hazardous components which must be listed on the label:

- hydrochloric acid

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

Section 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)		Classification (67/548/EEC)
		Hazard class / Hazard category	Hazard statements	
hydrochloric acid				
Index-No. : 017-002-01-X	>= 25 - <= 36	Met. Corr.1	H290	Corrosive; C; R34 Irritant; Xi; R37
CAS-No. : 7647-01-0		STOT SE3	H335	
EC-No. : 231-595-7		Skin Corr.1B	H314	
Registration : 01-2119484862-27-xxxx				

For the full text of the R-phrases mentioned in this Section, see Section 16.

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

Section 4: First aid measures

4.1. Description of first aid measures

- General advice : Take off all contaminated clothing immediately.
- If inhaled : If unconscious place in recovery position and seek medical advice. Remove to fresh air.
- In case of skin contact : Wash off immediately with soap and plenty of water. Call a physician immediately.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.

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If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting - seek medical advice.

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

Symptoms : corrosive effects

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

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

Treatment : Treat symptomatically.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : The product itself does not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : No information available.

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting : Under fire conditions: Hydrogen chloride gas, Gives off hydrogen by reaction with metals.

5.3. Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)

Further information : Cool closed containers exposed to fire with water spray. Heating will cause a pressure rise - with risk of bursting. Suppress (knock down) gases/vapours/mists with a water spray jet. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment. Keep people away from and upwind of spill/leak. Provide adequate ventilation. Avoid contact with the skin and the eyes. Do not breathe vapours.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material

Hydrochloric Acid 25% - 36%

reaches soil inform authorities responsible for such cases.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up : Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal. Flush away residuals with plenty of water.

Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

Section 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling : Handle and open container with care. Use personal protective equipment. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.

Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep in an area equipped with acid resistant flooring. Suitable materials for containers: glass; Polypropylene; polyethylene containers; Unsuitable materials for containers: Metals

Advice on protection against fire and explosion : The product is not flammable. Gives off hydrogen by reaction with metals. Risk of explosion.

Further information on storage conditions : Keep container tightly closed. Keep in a well-ventilated place. Keep away from heat.

Advice on common storage : Keep away from food, drink and animal feedingstuffs. Corrosive in contact with metals Materials to avoid sodium hypochlorite alkalis

German storage class : 8 Corrosive Substances

7.3. Specific end use(s)

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Specific use(s) : Identified use: See table in front of appendix for a complete overview of identified uses.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Component:	hydrochloric acid	CAS-No.	7647-01-0
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Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL		
Workers, Acute - local effects, Inhalation	:	15 mg/m ³
DNEL		
Workers, Long-term - local effects, Inhalation	:	8 mg/m ³

Predicted No Effect Concentration (PNEC)

Fresh water	:	36 µg/l
Marine water	:	36 µg/l
Intermittent releases	:	45 µg/l
Sewage treatment plant (STP)	:	36 µg/l

Other Occupational Exposure Limit Values

EU ELV, Short Term Exposure Limit (STEL):
10 ppm, 15 mg/m³
Indicative

EU ELV, Time Weighted Average (TWA):
5 ppm, 8 mg/m³
Indicative

EH40 WEL, Time Weighted Average (TWA):, Gas and aerosol mists.
1 ppm, 2 mg/m³

EH40 WEL, Short Term Exposure Limit (STEL):, Gas and aerosol mists.
5 ppm, 8 mg/m³

ELV (IE), Time Weighted Average (TWA):
5 ppm, 8 mg/m³
Indicative OELV

ELV (IE), Short Term Exposure Limit (STEL):
10 ppm, 15 mg/m³
Indicative OELV

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8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice : In case of insufficient ventilation, wear suitable respiratory equipment.
Required, if exposure limit is exceeded (e.g. OEL).
Combination filter:E-P2

Hand protection

Advice : The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material : butyl-rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Nitrile rubber
Break through time : ≥ 8 h
Glove thickness : 0.35 mm

Material : polychloroprene
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Fluorinated rubber
Break through time : ≥ 8 h
Glove thickness : 0.4 mm

Material : Polyvinylchloride
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Eye protection

Advice : Tightly fitting safety goggles

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Skin and body protection

Advice : Acid resistant protective clothing.

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
 Avoid subsoil penetration.
 If the product contaminates rivers and lakes or drains inform respective authorities.
 If material reaches soil inform authorities responsible for such cases.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	: liquid
Colour	: colourless to yellowish
Odour	: stinging
Odour Threshold	: no data available
pH	: < 0.1 (20 °C)
Solidification point	: -40 °C
Boiling point/boiling range	: ca. 90 °C
Flash point	: not applicable
Evaporation rate	: no data available
Flammability (solid, gas)	: does not ignite
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: 21.8 hPa (20 °C)
Relative vapour density	: no data available
Density	: 1.15 - 1.17 g/cm ³ (20 °C)
Water solubility	: completely miscible
Partition coefficient: n-octanol/water	: log Kow -0.25 log Pow

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Auto-ignition temperature	:	no data available
Thermal decomposition	:	no data available
Viscosity, dynamic	:	1.74 mPa.s (20 °C)
Explosivity	:	Product is not explosive.
Oxidizing properties	:	no data available

9.2. Other information

Corrosion to metals	:	Corrosive to metals
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Section 10: Stability and reactivity

10.1. Reactivity

Advice	:	No decomposition if stored and applied as directed.
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10.2. Chemical stability

Advice	:	No decomposition if stored and applied as directed. Decomposes on heating.
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10.3. Possibility of hazardous reactions

Hazardous reactions	:	Hydrogen, by reaction with metals Explosive properties May develop chlorine if mixed with sodium hypochlorite or oxidizing agents (e.g. potassium permanganate, magnesium oxide and hydrogen peroxide).
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10.4. Conditions to avoid

Conditions to avoid	:	Heat.
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10.5. Incompatible materials

Materials to avoid	:	Metals, sodium hypochlorite, Amines, fluorine, Strong oxidizing agents, Chlorite, Cyanides, alkalines
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10.6. Hazardous decomposition products

Hazardous decomposition products	:	Hydrogen chloride gas
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Section 11: Toxicological information

11.1. Information on toxicological effects

Irritation

Hydrochloric Acid 25% - 36%

Skin

Result : corrosive effects (rabbit)

Eyes

Result : corrosive effects (rabbit)
Risk of serious damage to eyes.

Sensitisation

Result : not sensitizing (guinea pig) (Maximisation Test)

Further information

Other relevant toxicity information : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

Component:	hydrochloric acid	CAS-No. 7647-01-0
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Acute toxicity

Oral

no data available

Dermal

LD50 Dermal : > 5010 mg/kg (rabbit)

Section 12: Ecological information

12.1. Toxicity

Component:	hydrochloric acid	CAS-No. 7647-01-0
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Acute toxicity

Fish

LC50 : 7.45 mg/l (Oncorhynchus mykiss; 96 h)

LC50 : 24.6 mg/l (Lepomis macrochirus; 96 h)

Toxicity to daphnia and other aquatic invertebrates

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EC50 : 0.492 mg/l (Daphnia magna; 48 h)

algae

EC50 : 0.78 mg/l (Pseudokirchneriella subcapitata; 72 h)

12.2. Persistence and degradability

Component:	hydrochloric acid	CAS-No.
		7647-01-0

Persistence and degradability

Biodegradability

Result : Inorganic product which is not removable from water by biological processes.

12.3. Bioaccumulative potential

Component:	hydrochloric acid	CAS-No.
		7647-01-0

Bioaccumulation

Result : Bioaccumulation is not expected.

12.4. Mobility in soil

Component:	hydrochloric acid	CAS-No.
		7647-01-0

Mobility

Soil : Not expected to adsorb on soil.

12.5. Results of PBT and vPvB assessment

Component:	hydrochloric acid	CAS-No.
		7647-01-0

Results of PBT and vPvB assessment

Result : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

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12.6. Other adverse effects

Additional ecological information

Result : Harmful effects to aquatic organisms due to pH-shift.
Neutralization is normally necessary before waste water is discharged into water treatment plants.
Do not flush into surface water or sanitary sewer system.

Section 13: Disposal considerations

13.1. Waste treatment methods

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.

Contaminated packaging : Empty remaining contents. Packagings that cannot be cleaned are to be disposed of in the same manner as the product. Dispose of in accordance with local regulations.

European Waste Catalogue Number : No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

Section 14: Transport information

14.1. UN number

1789

14.2. UN proper shipping name

ADR : HYDROCHLORIC ACID
RID : HYDROCHLORIC ACID
IMDG : HYDROCHLORIC ACID

14.3. Transport hazard class(es)

ADR-Class : 8
(Labels; Classification Code; Hazard identification No; Tunnel restriction code) 8; C1; 80; (E)

RID-Class : 8
(Labels; Classification Code; Hazard identification No) 8; C1; 80

IMDG-Class : 8
(Labels; EmS) 8; F-A, S-B

Hydrochloric Acid 25% - 36%

14.4. Packaging group

ADR : II
 RID : II
 IMDG : II

14.5. Environmental hazards

Labeling according to 5.2.1.8 ADR : no
 Labeling according to 5.2.1.8 RID : no
 Labeling according to 5.2.1.6.3 IMDG : no
 Classification as environmentally hazardous according to 2.9.3 IMDG : no
 Classified as "P" according to 2.10 IMDG : no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

Section 15: Regulatory information

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

UK ISR : hydrochloric acid: Annual reporting level threshold: 10,000 kg
 Other regulations : Occupational restrictions: Take note of Dir 92/85/EEC on the safety and health of pregnant workers at work and of Dir 94/33/EC on the protection of young people at work.

hydrochloric acid

EU. Regulation 273/2004, Drug Precursors, Category 3
 Scheduled substance Combined Nomenclature (CN) code:
 2806 10 00

EU. Regulation No 1451/2007 [Biocides], Annex I, Active substances identified as existing (OJ (L 325)
 Listed EC Number: 231-595-7

EU. Directive 98/8/EC, Annex 1, Active substances in biocidal products
 Special provisions may apply; see text of legislation. Minimum purity: 999 g/kg
 Private area and public health area disinfectants and other biocidal products

EU. Directive 98/8/EC, Annex 1, Active substances in biocidal products
 Expiry Date of Inclusion: 30 Apr 2024

EU. Directive 98/8/EC, Annex 1, Active substances in biocidal

Hydrochloric Acid 25% - 36%

products
Inclusion Date: 1 May 2014

EU. Directive 98/8/EC, Annex 1, Active substances in biocidal products
Deadline for Compliance: 30 Apr 2016

:

15.2. Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for this substance.

Section 16: Other information

Full text of R-phrases referred to under sections 2 and 3.

R34	Causes burns.
R37	Irritating to respiratory system.

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.

Further information

Other information : Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text

|| Indicates updated section.

Hydrochloric Acid 25% - 36%

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	3	8, 9	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2	NA	ES0004963
2	Use as an intermediate	3	4, 8, 9, 11, 12, 13, 19	NA	1, 2, 3, 4, 9, 15	6a	NA	ES0004629
3	Formulation & (re)packing of substances and mixtures	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9	2	NA	ES0004648
4	Industrial use	3	2a, 2b, 5, 14, 15, 16	NA	1, 2, 3, 4, 9, 10, 13, 15, 19	4, 6b	NA	ES0004683
5	Professional use	22	20, 23	NA	1, 2, 3, 4, 8a, 10, 11, 13, 15, 19	8a, 8b, 8e	NA	ES0004748
6	Consumer use	21	NA	20, 21, 35, 37, 38	NA	8b, 8e	NA	ES0004794

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1. Short title of Exposure Scenario 1: Manufacture of substance

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2

No exposure assessment presented for the environment.

Amount used	not applicable	
Frequency and duration of use	Continuous exposure	360 days/year
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
		Prevent leaks and prevent soil / water pollution caused by leaks. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	0.5 - 10 kPa
	Process Temperature	20 °C
		Assumes use at not more than 20°C above ambient temperature., It should be noted that the process temperature may be higher, but the substance temperature is down to ambient at worker contact points.
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Exposure duration per day	480 min
	Exposure duration per day	240 min(only PROC15)

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	Frequency of use	5 days/week(only PROC15)
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
	Handle substance within a closed system.(PROC1, PROC2, PROC3)	
	Clear transfer lines prior to de-coupling.(PROC1, PROC2, PROC3, PROC4)	
	Ensure material transfers are under containment or extract ventilation. (Efficiency: 90 %)(PROC2, PROC3)	
	Use drum pumps.	
	Use bulk or semi-bulk handling systems.(PROC4)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC4, PROC8a, PROC8b)	
	Handle substance within a predominantly closed system provided with extract ventilation.(PROC8a, PROC8b, PROC9)	
	Fill containers/cans at dedicated filling points supplied with local extract ventilation.(PROC9)	
Organisational measures to prevent /limit releases, dispersion and exposure	Handle in a fume cupboard or under extract ventilation. Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)	
	Provide basic employee training to prevent/minimize exposures Ensure that no inhalable aerosols are generated	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin. Use suitable eye protection. Wear chemically resistant gloves.	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment. Substance will disassociate upon contact with water, the only effect is the pH effect, therefore after passing through the STP exposure is considered negligible and with no risk.

Workers

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0.02mg/m ³	0
PROC2	---	Worker - inhalative, long-term - local	1.50mg/m ³	0.2
PROC4	---	Worker - inhalative, long-term - local	3.00mg/m ³	0.4
PROC3	---	Worker - inhalative, long-term - local	3.75mg/m ³	0.5
PROC8a, PROC8b, PROC9	---	Worker - inhalative, long-term - local	7.50mg/m ³	0.9
PROC15	---	Worker - inhalative, long-term - local	1.8mg/m ³	0.9

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For scaling see: <http://www.ecetoc.org/tra>

Additional good practice advice beyond the REACH Chemical Safety Assessment

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Assumes a good basic standard of occupational hygiene is implemented.

Hydrochloric Acid 25% - 36%

1. Short title of Exposure Scenario 2: Use as an intermediate

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU4: Manufacture of food products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU11: Manufacture of rubber products SU12: Manufacture of plastics products, including compounding and conversion SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

2.1 Contributing scenario controlling environmental exposure for: ERC6a

No exposure assessment presented for the environment.

Amount used	not applicable	
Frequency and duration of use	Continuous exposure	360 days/year
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
		Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases. Prevent leaks and prevent soil / water pollution caused by leaks.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC9, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	0.5 - 10 kPa
	Process Temperature	20 °C
	Assumes use at not more than 20°C above ambient temperature., It should be noted that the process temperature may be higher, but the substance temperature is down to ambient at worker contact points.	
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Exposure duration per day	< 8 h
	Exposure duration per day	< 4 h(only PROC15)

Hydrochloric Acid 25% - 36%

	Frequency of use	5 days/week(only PROC15)
Technical conditions and measures to control dispersion from source towards the worker	Avoid splashing.	
	Handle substance within a closed system.(PROC1, PROC2, PROC3)	
	Clear transfer lines prior to de-coupling.(PROC1, PROC2, PROC3, PROC4)	
	Ensure material transfers are under containment or extract ventilation. (Efficiency: 90 %)(PROC2, PROC3)	
	Drain down and flush system prior to equipment opening or maintenance.(PROC3, PROC4)	
	Use drum pumps.	
	Use bulk or semi-bulk handling systems.(PROC4)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC4)	
	Handle substance within a predominantly closed system provided with extract ventilation.	
	Fill containers/cans at dedicated filling points supplied with local extract ventilation. (Efficiency: 90 %)(PROC9)	
Handle in a fume cupboard or under extract ventilation.		
Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)		
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
	Ensure that no inhalable aerosols are generated	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin.	
	Use suitable eye protection.	
	Wear chemically resistant gloves.	
	Wear suitable gloves tested to EN374.(PROC3)	
Risk Management Measures are based on qualitative risk characterisation.		

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment. Substance will disassociate upon contact with water, the only effect is the pH effect, therefore after passing through the STP exposure is considered negligible and with no risk.

Workers

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0.02mg/m ³	0
PROC2	---	Worker - inhalative, long-term - local	1.50mg/m ³	0.2
PROC3	---	Worker - inhalative, long-term - local	3.75mg/m ³	0.5
PROC4	---	Worker - inhalative, long-term - local	3.00mg/m ³	0.4
PROC9	---	Worker - inhalative, long-term - local	7.5mg/m ³	0.9
PROC15	---	Worker - inhalative, long-term - local	1.8mg/m ³	0.9

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment

Hydrochloric Acid 25% - 36%

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
For scaling see: <http://www.ecetoc.org/tra>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

Hydrochloric Acid 25% - 36%

1. Short title of Exposure Scenario 3: Formulation & (re)packing of substances and mixtures

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC2: Formulation of preparations
Activity	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for: ERC2

No exposure assessment presented for the environment.

Amount used	not applicable	
Frequency and duration of use	Continuous exposure	360 days/year
Technical conditions and measures at process level (source) to prevent release	Water	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Organizational measures to prevent/limit release from the site		

Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
Prevent leaks and prevent soil / water pollution caused by leaks.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	0.5 - 10 kPa
	Process Temperature	20 °C
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	5 days/week
Other operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature).	

Hydrochloric Acid 25% - 36%

Technical conditions and measures to control dispersion from source towards the worker	Ensure material transfers are under containment or extract ventilation. (Efficiency: 90 %)(PROC2, PROC3)
	Drain down and flush system prior to equipment opening or maintenance.(PROC3, PROC4, PROC5)
	Avoid splashing.(PROC9, PROC15)
	Handle substance within a predominantly closed system provided with extract ventilation. (Efficiency: 90 %)(PROC8a, PROC8b, PROC9, PROC15)
	Clear transfer lines prior to de-coupling.
	Handle substance within a closed system.(PROC1, PROC2, PROC3)
	Use bulk or semi-bulk handling systems.(PROC4)
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC4, PROC8a, PROC8b, PROC15)
	Use drum pumps.(PROC4, PROC5)
	Transfer materials directly to mixing vessels.(PROC5)
Fill containers/cans at dedicated filling points supplied with local extract ventilation. (Efficiency: 90 %)(PROC9, PROC15)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin.
	Use suitable eye protection.
	Wear chemically resistant gloves. Wear suitable gloves tested to EN374.(PROC3)
Risk Management Measures are based on qualitative risk characterisation.	

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment. Substance will disassociate upon contact with water, the only effect is the pH effect, therefore after passing through the STP exposure is considered negligible and with no risk.

Workers

PROC1, PROC5, PROC8a, PROC8b, PROC9 Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0.02mg/m ³	0
PROC2	---	Worker - inhalative, long-term - local	1.50mg/m ³	0.2
PROC3	---	Worker - inhalative, long-term - local	3.75mg/m ³	0.5
PROC4	---	Worker - inhalative, long-term - local	3.00mg/m ³	0.4
PROC5, PROC8a, PROC8b, PROC9	---	Worker - inhalative, long-term - local	7.50mg/m ³	0.9

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For scaling see: <http://www.ecetoc.org/tra>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

Hydrochloric Acid 25% - 36%

1. Short title of Exposure Scenario 4: Industrial use

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU2a: Mining (without offshore industries) SU2b: Offshore industries SU5: Manufacture of textiles, leather, fur SU14: Manufacture of basic metals, including alloys SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6b

No exposure assessment presented for the environment.

Amount used	not applicable	
Frequency and duration of use	Continuous exposure	360 days/year
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
		Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases. Prevent leaks and prevent soil / water pollution caused by leaks.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC9, PROC10, PROC13, PROC15, PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	0.5 - 10 kPa
	Process Temperature	< 100 °C
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Exposure duration per day	< 8 h
	Exposure duration per day	240 min(PROC15)

Hydrochloric Acid 25% - 36%

	Frequency of use	5 days/week(PROC15)
Other operational conditions affecting workers exposure	Operation is carried out at elevated temperature (> 20°C above ambient temperature).(PROC13)	
Technical conditions and measures to control dispersion from source towards the worker	Clear transfer lines prior to de-coupling.(PROC1, PROC2, PROC3)	
	Handle substance within a closed system.(PROC1, PROC2, PROC3)	
	Ensure material transfers are under containment or extract ventilation. (Efficiency: 90 %)(PROC2, PROC3)	
	Drain down and flush system prior to equipment opening or maintenance.(PROC3, PROC4)	
	Use bulk or semi-bulk handling systems. Use drum pumps.(PROC4)	
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC4)	
	Handle substance within a predominantly closed system provided with extract ventilation. Fill containers/cans at dedicated filling points supplied with local extract ventilation. (Efficiency: 90 %)(PROC9)	
	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) (Efficiency: 90 %)(PROC10)	
	Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC13)	
	Carry out in a vented booth provided with laminar airflow.(PROC13)	
Organisational measures to prevent /limit releases, dispersion and exposure	Handle in a fume cupboard or under extract ventilation. Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)	
	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin. Use suitable eye protection. Wear chemically resistant gloves.	
	Wear suitable gloves tested to EN374.(PROC3, PROC10, PROC13, PROC19)	
	Do not carry out the operation for more than 15 min. without respiratory protection	
	Wear a respirator conforming to EN140 with Type A filter or better.(PROC19)	

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment. Substance will disassociate upon contact with water, the only effect is the pH effect, therefore after passing through the STP exposure is considered negligible and with no risk.

Workers

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0.02mg/m ³	0
PROC2	---	Worker - inhalative, long-term - local	1.50mg/m ³	0.2
PROC3	---	Worker - inhalative, long-term - local	3.75mg/m ³	0.5
PROC9, PROC10,	---	Worker - inhalative, long-term - local	3.00mg/m ³	0.4

Hydrochloric Acid 25% - 36%

PROC13, PROC19				
PROC4	---	Worker - inhalative, long-term - local	3.00mg/m ³	0.4
PROC15	---	Worker - inhalative, long-term - local	1.8mg/m ³	0.9

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For scaling see: <http://www.ecetoc.org/tra>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

Hydrochloric Acid 25% - 36%

1. Short title of Exposure Scenario 5: Professional use

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU20: Health services SU23: Electricity, steam, gas water supply and sewage treatment
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8e

No exposure assessment presented for the environment.

Frequency and duration of use	Continuous exposure	360 days/year
	Continuous exposure	8 hours/day
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Ensure all waste water is collected and treated via a WWTP., All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
		Prevent leaks and prevent soil / water pollution caused by leaks.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC10, PROC11, PROC13, PROC15, PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	0.5 - 10 kPa
	Process Temperature	20 °C
		Assumes use at not more than 20°C above ambient temperature.
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Exposure duration per day	< 8 h
	Frequency of use	5 days/week
Technical conditions and measures to control dispersion from source towards the worker	Handle substance within a closed system.(PROC1, PROC2, PROC3)	
	Ensure material transfers are under containment or extract ventilation. (Efficiency: 90 %)(PROC2, PROC3, PROC4)	
	Clear transfer lines prior to de-coupling.(PROC1, PROC2, PROC3, PROC4, PROC8a)	

Hydrochloric Acid 25% - 36%

	Drain down and flush system prior to equipment opening or maintenance.(PROC3, PROC4)
	Use bulk or semi-bulk handling systems. Use drum pumps.(PROC4)
	Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC4, PROC8a, PROC11)
	Handle substance within a predominantly closed system provided with extract ventilation. (Efficiency: 90 %)(PROC8a)
	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) (Efficiency: 90 %)(PROC10)
	Carry out in a vented booth provided with laminar airflow. Allow time for product to drain from workpiece. Automate activity where possible.(PROC13)
	Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC13)
	Handle in a fume cupboard or under extract ventilation. Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures
	Ensure minimization of manual phases(PROC13)
	Avoid carrying out operation for more than 4 hours.(PROC15)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable coveralls to prevent exposure to the skin. Use suitable eye protection. Wear chemically resistant gloves.
	Wear suitable gloves tested to EN374.(PROC3, PROC10, PROC11, PROC13, PROC19)
	Wear a half face respirator conforming to EN140 Type A filter or better(PROC11, PROC19)
	Do not carry out the operation for more than 15 min. without respiratory protection(PROC11, PROC19)
	Wear suitable gloves tested to EN374.(PROC3)
	Wear a respirator conforming to EN140 with Type A filter or better.

Risk Management Measures are based on qualitative risk characterisation.

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment. Substance will disassociate upon contact with water, the only effect is the pH effect, therefore after passing through the STP exposure is considered negligible and with no risk.

Workers

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	---	Worker - inhalative, long-term - local	1.50mg/m ³	0.2
PROC3	---	Worker - inhalative, long-term - local	3.75mg/m ³	0.5
PROC8a, PROC10, PROC13, PROC19	---	Worker - inhalative, long-term - local	7.50mg/m ³	0.9
PROC4	---	Worker - inhalative, long-term - local	3.00mg/m ³	0.4
PROC15	---	Worker - inhalative, long-term - local	1.8mg/m ³	0.9

Hydrochloric Acid 25% - 36%

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For scaling see: <http://www.ecetoc.org/tra>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

Hydrochloric Acid 25% - 36%

1. Short title of Exposure Scenario 6: Consumer use

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents PC21: Laboratory chemicals PC35: Washing and cleaning products (including solvent based products) PC37: Water treatment chemicals PC38: Welding and soldering products (with flux coatings or flux cores), flux products
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8e

No exposure assessment presented for the environment.

Amount used	not applicable	
Frequency and duration of use	Continuous exposure	360 days/year
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
		Prevent leaks and prevent soil / water pollution caused by leaks. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.

2.2 Contributing scenario controlling consumer exposure for: PC20, PC21, PC35, PC37, PC38

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	Liquid, moderate fugacity
	Vapour pressure	0.5 - 10 kPa
	Process Temperature	20 °C
Amount used	Amount used per event	500 ml
Frequency and duration of use	Exposure duration per event	240 min
	Frequency of use	5 Times per year:
Human factors not influenced by risk management	Assumes use at not more than 20°C above ambient temperature.	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Application Route	Consumer use
	Exposure routes	Dermal exposure
	Consumer Measures	The substance may cause local irritating effects
	Risk Management Measures are based on qualitative risk characterisation.	

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment. Substance will disassociate upon contact with water, the only effect is the pH effect, therefore after passing through the STP exposure is considered negligible and with no risk.

Hydrochloric Acid 25% - 36%

Consumers

Exposures have not been estimated as the substance only causes local dermal and/or inhalatory effects and no systemic effects. The use is assessed to be safe.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

PCH.038
Hydrochloric Acid 32 %

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Version: 2 (Replaced 1)

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

1.1 Product identifier: PCH.038
Hydrochloric Acid 32 %

Other means of identification:

Non-applicable

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

Relevant uses: Chemical industry. For professional users/industrial user only.

Uses advised against: All uses not specified in this section or in section 7.3

1.3 Details of the supplier of the safety data sheet:

Pearl Chemicals Limited
Whitebridge Estate, Whitebridge Lane
ST15 8LQ Stone - Staffordshire - United Kingdom
Phone: +44 (0) 1785 819 747
enquiries@pearlchem.co.uk
www.pearlchem.co.uk/

1.4 Emergency telephone number: +44 (0) 1785 819 747

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

GB CLP Regulation:

Classification of this product has been carried out in accordance with GB CLP Regulation.

Eye Dam. 1: Serious eye damage, Category 1, H318

Met. Corr. 1: Corrosive to metals, Category 1, H290

Skin Corr. 1B: Skin corrosion, Category 1B, H314

STOT SE 3: Respiratory tract toxicity, single exposure, Category 3, H335

2.2 Label elements:

GB CLP Regulation:

Danger



Hazard statements:

Met. Corr. 1: H290 - May be corrosive to metals.

Skin Corr. 1B: H314 - Causes severe skin burns and eye damage.

STOT SE 3: H335 - May cause respiratory irritation.

Precautionary statements:

P234: Keep only in original container.

P280: Wear protective gloves/face protection/protective clothing/respiratory protection/protective footwear.

P301+P330+P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340: IF INHALED: Remove victim to 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.

P403+P233: Store in a well-ventilated place. Keep container tightly closed.

P501: Dispose of the contents and/or its container in line with regulations on dangerous waste or packaging and waste packaging respectively.

Substances that contribute to the classification

Hydrochloric acid

2.3 Other hazards:

Product fails to meet PBT/vPvB criteria

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

- CONTINUED ON NEXT PAGE -

PCH.038
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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS (continued)

3.1 Substance:

Non-applicable

3.2 Mixture:

Chemical description: Chemical substance

Components:

In accordance with Annex II of The REACH etc. (Amendment etc.) (EU Exit) Regulations 2020, the product contains:

Identification	Chemical name/Classification	Concentration
CAS: Non-applicable	Hydrochloric acid Met. Corr. 1: H290; Skin Corr. 1B: H314; STOT SE 3: H335 - Danger	 25 - <50 %

To obtain more information on the hazards of the substances consult sections 11, 12 and 16.

Other information:

Identification	Specific concentration limit
Hydrochloric acid CAS: Non-applicable	% (w/w) \geq 0.1: Met. Corr. 1 - H290 % (w/w) \geq 25: Skin Corr. 1B - H314 10 \leq % (w/w) <25: Skin Irrit. 2 - H315 % (w/w) \geq 25: Eye Dam. 1 - H318 10 \leq % (w/w) <25: Eye Irrit. 2 - H319 % (w/w) \geq 10: STOT SE 3 - H335

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures:

Request medical assistance immediately, showing the SDS of this product.

By inhalation:

Remove the person affected from the area of exposure, provide with fresh air and keep at rest. In serious cases such as cardiorespiratory failure, artificial resuscitation techniques will be necessary (mouth to mouth resuscitation, cardiac massage, oxygen supply, etc.) requiring immediate medical assistance.

By skin contact:

Remove contaminated clothing and footwear, rinse skin or shower the person affected if appropriate with plenty of cold water and neutral soap. In serious cases see a doctor. If the product causes burns or freezing, clothing should not be removed as this could worsen the injury caused if it is stuck to the skin. If blisters form on the skin, these should never be burst as this will increase the risk of infection.

By eye contact:

Rinse eyes thoroughly with lukewarm water for at least 15 minutes. Do not allow the person affected to rub or close their eyes. If the injured person uses contact lenses, these should be removed unless they are stuck to the eyes, in which case this could cause further damage. In all cases, after cleaning, a doctor should be consulted as quickly as possible with the SDS of the product.

By ingestion/aspiration:

Request immediate medical assistance, showing the SDS of this product. Do not induce vomiting, because its expulsion from the stomach can be hazardous to the mucus of the main digestive tract, and also risk damage to the respiratory system through inhalation. Rinse out the mouth and throat, as they may have been affected during ingestion. In the case of loss of consciousness do not administer anything orally unless supervised by a doctor. Keep the person affected at rest.

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

Acute and delayed effects are indicated in sections 2 and 11.

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

Non-applicable

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media:

Suitable extinguishing media:

- CONTINUED ON NEXT PAGE -

PCH.038
Hydrochloric Acid 32 %

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SECTION 5: FIREFIGHTING MEASURES (continued)

Product is non-flammable under normal conditions of storage, handling and use. In the case of combustion as a result of improper handling, storage or use preferably use polyvalent powder extinguishers (ABC powder), in accordance with the Regulation on fire protection systems.

Unsuitable extinguishing media:

Non-applicable

5.2 Special hazards arising from the substance or mixture:

As a result of combustion or thermal decomposition reactive sub-products are created that can become highly toxic and, consequently, can present a serious health risk.

5.3 Advice for firefighters:

Depending on the magnitude of the fire it may be necessary to use full protective clothing and self-contained breathing apparatus (SCBA). Minimum emergency facilities and equipment should be available (fire blankets, portable first aid kit,...).

Additional provisions:

Act in accordance with the Internal Emergency Plan and the Information Sheets on actions to take after an accident or other emergencies. Eliminate all sources of ignition. In case of fire, cool the storage containers and tanks for products susceptible to combustion, explosion or BLEVE as a result of high temperatures. Avoid spillage of the products used to extinguish the fire into an aqueous medium.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel:

Isolate leaks provided that there is no additional risk for the people performing this task. Personal protection equipment must be used against potential contact with the spilt product (See section 8). Evacuate the area and keep out those who do not have protection.

For emergency responders:

See section 8.

6.2 Environmental precautions:

This product is not classified as hazardous to the environment. Keep product away from drains, surface and underground water.

6.3 Methods and material for containment and cleaning up:

It is recommended:

Absorb the spillage using sand or inert absorbent and move it to a safe place. Do not absorb in sawdust or other combustible absorbents. For any concern related to disposal consult section 13.

6.4 Reference to other sections:

See sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling:

A.- Precautions for safe manipulation

Comply with the current legislation concerning the prevention of industrial risks. Keep containers hermetically sealed. Control spills and residues, destroying them with safe methods (section 6). Avoid leakages from the container. Maintain order and cleanliness where dangerous products are used.

B.- Technical recommendations for the prevention of fires and explosions

Product is non-flammable under normal conditions of storage, handling and use. It is recommended to transfer at slow speeds to avoid the generation of electrostatic charges that can affect flammable products. Consult section 10 for information on conditions and materials that should be avoided.

C.- Technical recommendations to prevent ergonomic and toxicological risks

Do not eat or drink during the process, washing hands afterwards with suitable cleaning products.

D.- Technical recommendations to prevent environmental risks

It is recommended to have absorbent material available at close proximity to the product (See subsection 6.3)

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SECTION 7: HANDLING AND STORAGE (continued)

7.2 Conditions for safe storage, including any incompatibilities:

A.- Technical measures for storage

Minimum Temp.: 2 °C
Maximum Temp.: 35 °C
Maximum time: 24 Months

B.- General conditions for storage

Avoid sources of heat, radiation, static electricity and contact with food. For additional information see subsection 10.5

7.3 Specific end use(s):

Except for the instructions already specified it is not necessary to provide any special recommendation regarding the uses of this product.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters:

Substances whose occupational exposure limits have to be monitored in the workplace:

There are no occupational exposure limits for the substances contained in the product

DNEL (Workers):

Identification		Short exposure		Long exposure	
		Systemic	Local	Systemic	Local
Hydrochloric acid	Oral	Non-applicable	Non-applicable	Non-applicable	Non-applicable
CAS: Non-applicable	Dermal	Non-applicable	Non-applicable	Non-applicable	Non-applicable
EC: 231-595-7	Inhalation	Non-applicable	15 mg/m ³	Non-applicable	8 mg/m ³

DNEL (General population):

Identification		Short exposure		Long exposure	
		Systemic	Local	Systemic	Local
Hydrochloric acid	Oral	Non-applicable	Non-applicable	Non-applicable	Non-applicable
CAS: Non-applicable	Dermal	Non-applicable	Non-applicable	Non-applicable	Non-applicable
EC: 231-595-7	Inhalation	Non-applicable	15 mg/m ³	Non-applicable	8 mg/m ³

PNEC:

Non-applicable

8.2 Exposure controls:

A.- Individual protection measures, such as personal protective equipment

As a preventative measure it is recommended to use basic Personal Protective Equipment, with the corresponding <<UKCA marking>>. For more information on Personal Protective Equipment (storage, use, cleaning, maintenance, class of protection,...) consult the information leaflet provided by the manufacturer. For more information see subsection 7.1. All information contained herein is a recommendation which needs some specification from the labour risk prevention services as it is not known whether the company has additional measures at its disposal.

B.- Respiratory protection

Pictogram	PPE	Remarks
 Mandatory respiratory tract protection	Filter mask for gases and vapours	Replace when there is a taste or smell of the contaminant inside the face mask. If the contaminant comes with warnings it is recommended to use isolation equipment.

C.- Specific protection for the hands

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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (continued)

Pictogram	PPE	Remarks
 Mandatory hand protection	NON-disposable chemical protective gloves	The Breakthrough Time indicated by the manufacturer must exceed the period during which the product is being used. Do not use protective creams after the product has come into contact with skin.

As the product is a mixture of several substances, the resistance of the glove material can not be calculated in advance with total reliability and has therefore to be checked prior to the application.

D.- Ocular and facial protection

Pictogram	PPE	Remarks
 Mandatory face protection	Face shield	Clean daily and disinfect periodically according to the manufacturer's instructions. Use if there is a risk of splashing.

E.- Body protection

Pictogram	PPE	Remarks
 Mandatory complete body protection	Disposable clothing for protection against chemical risks	For professional use only. Clean periodically according to the manufacturer's instructions.
 Mandatory foot protection	Safety footwear for protection against chemical risk	Replace boots at any sign of deterioration.

F.- Additional emergency measures

Emergency measure	Standards	Emergency measure	Standards
 Emergency shower	ANSI Z358-1 ISO 3864-1:2011, ISO 3864-4:2011	 Eyewash stations	DIN 12 899 ISO 3864-1:2011, ISO 3864-4:2011

Environmental exposure controls:

In accordance with the community legislation for the protection of the environment it is recommended to avoid environmental spillage of both the product and its container. For additional information see subsection 7.1.D

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

For complete information see the product datasheet.

Appearance:

Physical state at 20 °C: Liquid
Appearance: Fluid
Colour: Yellowish
Odour: Pungent
Odour threshold: Non-applicable *

Volatility:

Boiling point at atmospheric pressure: 100 °C
Vapour pressure at 20 °C: 2350 Pa
Vapour pressure at 50 °C: 12381.01 Pa (12.38 kPa)

*Not relevant due to the nature of the product, not providing information property of its hazards.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (continued)

Evaporation rate at 20 °C:	Non-applicable *
Product description:	
Density at 20 °C:	1159 - 1169 kg/m ³
Relative density at 20 °C:	1.159 - 1.169
Dynamic viscosity at 20 °C:	1.85 cP
Kinematic viscosity at 20 °C:	1.57 mm ² /s
Kinematic viscosity at 40 °C:	Non-applicable *
Concentration:	Non-applicable *
pH:	Non-applicable *
Vapour density at 20 °C:	Non-applicable *
Partition coefficient n-octanol/water 20 °C:	Non-applicable *
Solubility in water at 20 °C:	Non-applicable *
Solubility properties:	Completely miscible
Decomposition temperature:	Non-applicable *
Melting point/freezing point:	Non-applicable *
Flammability:	
Flash Point:	Non Flammable (>60 °C)
Flammability (solid, gas):	Non-applicable *
Autoignition temperature:	Non-applicable *
Lower flammability limit:	Non-applicable *
Upper flammability limit:	Non-applicable *
Particle characteristics:	
Median equivalent diameter:	Non-applicable
9.2 Other information:	
Information with regard to physical hazard classes:	
Explosive properties:	Non-applicable *
Oxidising properties:	Non-applicable *
Corrosive to metals:	H290 May be corrosive to metals.
Heat of combustion:	Non-applicable *
Aerosols-total percentage (by mass) of flammable components:	Non-applicable *
Other safety characteristics:	
Surface tension at 20 °C:	Non-applicable *
Refraction index:	Non-applicable *

*Not relevant due to the nature of the product, not providing information property of its hazards.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity:

No hazardous reactions are expected because the product is stable under recommended storage conditions. See section 7.

10.2 Chemical stability:

Chemically stable under the conditions of storage, handling and use.

10.3 Possibility of hazardous reactions:

Under the specified conditions, hazardous reactions that lead to excessive temperatures or pressure are not expected.

10.4 Conditions to avoid:

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SECTION 10: STABILITY AND REACTIVITY (continued)

Applicable for handling and storage at room temperature:

Shock and friction	Contact with air	Increase in temperature	Sunlight	Humidity
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

10.5 Incompatible materials:

Acids	Water	Oxidising materials	Combustible materials	Others
Not applicable	Not applicable	Precaution	Not applicable	Avoid alkalis or strong bases

10.6 Hazardous decomposition products:

See subsection 10.3, 10.4 and 10.5 to find out the specific decomposition products. Depending on the decomposition conditions, complex mixtures of chemical substances can be released: carbon dioxide (CO₂), carbon monoxide and other organic compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

The experimental information related to the toxicological properties of the product itself is not available

Dangerous health implications:

In case of exposure that is repetitive, prolonged or at concentrations higher than the recommended occupational exposure limits, adverse effects on health may result, depending on the means of exposure:

A- Ingestion (acute effect):

- Acute toxicity : Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for consumption. For more information see section 3.
- Corrosivity/Irritability: Corrosive product, if it is swallowed causes burns destroying the tissues. For more information about secondary effects from skin contact see section 2.

B- Inhalation (acute effect):

- Acute toxicity : Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for inhalation. For more information see section 3.
- Corrosivity/Irritability: Prolonged inhalation of the product is corrosive to mucous membranes and the upper respiratory tract

C- Contact with the skin and the eyes (acute effect):

- Contact with the skin: Above all, skin contact may occur as fabrics of all thicknesses can be destroyed, resulting in burns. For more information on the secondary effects see section 2.
- Contact with the eyes: Produces serious eye damage after contact.

D- CMR effects (carcinogenicity, mutagenicity and toxicity to reproduction):

- Carcinogenicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for the effects mentioned. For more information see section 3.
IARC: Non-applicable
- Mutagenicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.
- Reproductive toxicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

E- Sensitizing effects:

- Respiratory: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous with sensitising effects. For more information see section 3.
- Cutaneous: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

F- Specific target organ toxicity (STOT) - single exposure:

Causes irritation in respiratory passages, which is normally reversible and limited to the upper respiratory passages.

G- Specific target organ toxicity (STOT)-repeated exposure:

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SECTION 11: TOXICOLOGICAL INFORMATION (continued)

- Specific target organ toxicity (STOT)-repeated exposure: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.
- Skin: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

H- Aspiration hazard:

Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

Other information:

Non-applicable

Specific toxicology information on the substances:

Identification	Acute toxicity		Genus
	LD50 oral	LD50 dermal	
Hydrochloric acid	>5000 mg/kg	>5000 mg/kg	
CAS: Non-applicable	LC50 inhalation	Non-applicable	

Acute Toxicity Estimate (ATE mix):

ATE mix		Ingredient(s) of unknown toxicity
Oral	>5000 mg/kg (Calculation method)	Non-applicable
Dermal	>5000 mg/kg (Calculation method)	Non-applicable
Inhalation	>20 mg/L (4 h) (Calculation method)	Non-applicable

SECTION 12: ECOLOGICAL INFORMATION

The experimental information related to the eco-toxicological properties of the product itself is not available

12.1 Toxicity:

Not available

12.2 Persistence and degradability:

Not available

12.3 Bioaccumulative potential:

Not available

12.4 Mobility in soil:

Not available

12.5 Results of PBT and vPvB assessment:

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SECTION 12: ECOLOGICAL INFORMATION (continued)

Product fails to meet PBT/vPvB criteria

12.6 Other adverse effects:

Not described

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

Code	Description	Waste class
	It is not possible to assign a specific code, as it depends on the intended use by the user	Dangerous

Type of waste:

HP5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity, HP8 Corrosive

Waste management (disposal and evaluation):

Consult the authorized waste service manager on the assessment and disposal operations in accordance The Waste Regulations 2011, 2011 No. 988. As under 15 01 of the code and in case the container has been in direct contact with the product, it will be processed the same way as the actual product. Otherwise, it will be processed as non-dangerous residue. We do not recommended disposal down the drain. See paragraph 6.2.

Regulations related to waste management:

In accordance with Annex II of UK REACH the provisions related to waste management are stated:

UK legislation: The Waste Regulations 2011.

SECTION 14: TRANSPORT INFORMATION

Transport of dangerous goods by land:

With regard to ADR 2021 and RID 2021:



- 14.1 UN number:** UN1789
14.2 UN proper shipping name: HYDROCHLORIC ACID
14.3 Transport hazard class(es): 8
 Labels: 8
14.4 Packing group: II
14.5 Environmental hazards: No
14.6 Special precautions for user
 Physico-Chemical properties: see section 9
14.7 Transport in bulk according to Annex II of Marpol and the IBC Code: Non-applicable

Transport of dangerous goods by sea:

With regard to IMDG 39-18:

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SECTION 14: TRANSPORT INFORMATION (continued)



- 14.1 UN number:** UN1789
14.2 UN proper shipping name: HYDROCHLORIC ACID
14.3 Transport hazard class(es): 8
 Labels: 8
14.4 Packing group: II
14.5 Marine pollutant: No
14.6 Special precautions for user
 Special regulations: Non-applicable
 EmS Codes: F-A, S-B
 Physico-Chemical properties: see section 9
 Limited quantities: 1 L
 Segregation group: SGG1
14.7 Transport in bulk according to Annex II of Marpol and the IBC Code: Non-applicable

Transport of dangerous goods by air:

With regard to IATA/ICAO 2022:



- 14.1 UN number:** UN1789
14.2 UN proper shipping name: HYDROCHLORIC ACID
14.3 Transport hazard class(es): 8
 Labels: 8
14.4 Packing group: II
14.5 Environmental hazards: No
14.6 Special precautions for user
 Physico-Chemical properties: see section 9
14.7 Transport in bulk according to Annex II of Marpol and the IBC Code: Non-applicable

SECTION 15: REGULATORY INFORMATION

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

Substances listed in UK REACH Authorisation List (Annex 14): Non-applicable
 Substances listed in UK candidate list of substances of very high concern (SVHCs): Non-applicable

The Control of Major Accident Hazards Regulations 2015:

Non-applicable

Limitations to commercialisation and the use of certain dangerous substances and mixtures (Annex XVII UK REACH, etc):

Shall not be used in:

- ornamental articles intended to produce light or colour effects by means of different phases, for example in ornamental lamps and ashtrays,
- tricks and jokes,
- games for one or more participants, or any article intended to be used as such, even with ornamental aspects.

Specific provisions in terms of protecting people or the environment:

It is recommended to use the information included in this safety data sheet as a basis for conducting workplace-specific risk assessments in order to establish the necessary risk prevention measures for the handling, use, storage and disposal of this product.

Other legislation:

The REACH etc. (Amendment etc.) (EU Exit) Regulations 2020.
 The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2020.
 Control of Substances Hazardous to Health Regulations 2002 (as amended)
 EH40/2005 Workplace exposure limits.

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SECTION 16: OTHER INFORMATION

Legislation related to safety data sheets:

This safety data sheet has been designed in accordance with ANNEX II-The REACH etc. (Amendment etc.) (EU Exit) Regulations 2020.

Texts of the legislative phrases mentioned in section 2:

H290: May be corrosive to metals.

H318: Causes serious eye damage.

H335: May cause respiratory irritation.

H314: Causes severe skin burns and eye damage.

Texts of the legislative phrases mentioned in section 3:

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3

GB CLP Regulation:

Met. Corr. 1: H290 - May be corrosive to metals.

Skin Corr. 1B: H314 - Causes severe skin burns and eye damage.

STOT SE 3: H335 - May cause respiratory irritation.

Classification procedure:

Eye Dam. 1: Calculation method

STOT SE 3: Calculation method

Skin Corr. 1B: Calculation method

Advice related to training:

Minimal training is recommended in order to prevent industrial risks for staff using this product and to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources:

<http://echa.europa.eu>

<http://eur-lex.europa.eu>

Abbreviations and acronyms:

ADR: European agreement concerning the international carriage of dangerous goods by road

IMDG: International maritime dangerous goods code

IATA: International Air Transport Association

ICAO: International Civil Aviation Organisation

COD: Chemical Oxygen Demand

BOD5: 5day biochemical oxygen demand

BCF: Bioconcentration factor

LD50: Lethal Dose 50

LC50: Lethal Concentration 50

EC50: Effective concentration 50

LogPOW: Octanolwater partition coefficient

Koc: Partition coefficient of organic carbon

UFI: unique formula identifier

IARC: International Agency for Research on Cancer

The information contained in this safety data sheet is based on sources, technical knowledge and current legislation at UK, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product, it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within our awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

- END OF SAFETY DATA SHEET -

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

Hydrogen Peroxide 35 - <50%

Version 4.0

Print Date 2013/10/31

Revision date / valid from 2013/10/31

MSDS code: MYYY760

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

1.1. Product identifier

Trade name : Hydrogen Peroxide 35 - <50%
 Substance name : hydrogen peroxide solution
 Index-No. : 008-003-00-9
 CAS-No. : 7722-84-1
 EC-No. : 231-765-0
 Registration number : 01-2119485845-22-xxxx

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

Use of the Substance/Mixture : At this time we do not yet have information on identified uses. They will be included in this safety data sheet when available.
 Uses advised against : At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company : Brenntag UK & Ireland
 Albion House, Rawdon Park
 GB LS19 7XX Leeds Yeadon
 Telephone : +44 (0) 113 3879 200
 Telefax : +44 (0) 113 3879 280
 E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
 +44 (0) 1865 407333 (N.C.E.C. Culham)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Acute toxicity (Oral)	Category 4	---	H302
Skin irritation	Category 2	---	H315

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Serious eye damage	Category 1	---	H318
Specific target organ toxicity - single exposure	Category 3	---	H335
Acute toxicity (Inhalation)	Category 4	---	H332

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

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Directive 67/548/EEC or 1999/45/EC	
Hazard symbol / Category of danger	Risk phrases
Harmful (Xn)Harmful (Xn)	R22
Irritant (Xi)Irritant (Xi)	R41, R37/38

For the full text of the R-phrases mentioned in this Section, see Section 16.

Most important adverse effects

- Human Health : See section 11 for toxicological information.
- Physical and chemical hazards : See section 9 for physicochemical information.
- Potential environmental effects : See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

- Hazard symbols : 
- Signal word : Danger
- Hazard statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
- Precautionary statements
- Prevention : P261 Avoid breathing vapours/spray.
P280 Wear protective gloves/ eye protection/ face protection.
- Response : P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.

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

P332 + P313 If skin irritation occurs: Get medical advice/attention.

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

Hazardous components which must be listed on the label:

- hydrogen peroxide solution

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

Section 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)		Classification (67/548/EEC)
		Hazard class / Hazard category	Hazard statements	
hydrogen peroxide solution				
Index-No. : 008-003-00-9		Ox. Liq.1	H271	R 5
CAS-No. : 7722-84-1		Acute Tox.4	H332	Oxidising; O; R 8
EC-No. : 231-765-0		Acute Tox.4	H302	Corrosive; C; R35
Registration : 01-2119485845-22-xxxx	>= 49 - < 50	Skin Corr.1A	H314	Harmful; Xn;
C&L-No. : 02-2119752423-42-0000		STOT SE3	H335	R20/22

For the full text of the R-phrases mentioned in this Section, see Section 16.

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

Section 4: First aid measures

4.1. Description of first aid measures

General advice : Take off all contaminated clothing immediately.

If inhaled : If unconscious place in recovery position and seek medical advice. Remove to fresh air.

In case of skin contact : Wash off immediately with plenty of water. If skin irritation persists, call a physician.

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- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 10 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
- If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately. If a person vomits when lying on his back, place him in the recovery position.

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

- Symptoms : See Section 11 for more detailed information on health effects and symptoms.
- Effects : See Section 11 for more detailed information on health effects and symptoms.

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

- Treatment : No information available.

Section 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Spray generously with water.
- Unsuitable extinguishing media : Do not use other extinguishing media.

5.2. Special hazards arising from the substance or mixture

- Specific hazards during firefighting : The product is not flammable. Oxygen released on exothermic decomposition may support combustion in case of surrounding fire. Heating will cause a pressure rise - with risk of bursting

5.3. Advice for firefighters

- Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)
- Further information : Cool closed containers exposed to fire with water spray. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- Personal precautions : Use personal protective equipment. Keep away unprotected persons. Avoid contact with skin and eyes. Do not breathe vapours or spray mist. For personal protection see section 8.

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6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal. Flush away residuals with plenty of water.

Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

Section 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling : Do not keep the container sealed. Provide sufficient air exchange and/or exhaust in work rooms. Avoid formation of aerosol. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.

Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Suitable materials for containers: Stainless steel; glass; Plastic container of HDPE; Unsuitable materials for containers: Brass; Copper; Iron

Advice on protection against fire and explosion : Not combustible. Oxidizing agent, may cause spontaneous ignition of combustible materials. In concentrations between 20 - 40 %: Liquid with minor oxidizing effect. With catalysts or at elevated temperatures hydrogen peroxide decomposes to water and oxygen.

Further information on storage conditions : Store in cool place. Keep in a well-ventilated place. Protect against light. Protect from contamination.

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Advice on common storage : Keep away from food, drink and animal feedingstuffs. Keep away from combustible material. Materials to avoid: Reducing agents

7.3. Specific end use(s)

Specific use(s) : No information available.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Component:	hydrogen peroxide solution	CAS-No.
		7722-84-1

Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL		
Workers, Acute - local effects, Inhalation	:	3 mg/m ³
DNEL		
Workers, Long-term - local effects, Inhalation	:	1.4 mg/m ³
DNEL		
Population, Acute - local effects, Inhalation	:	1.93 mg/m ³
DNEL		
Population, Long-term - local effects, Inhalation	:	0.21 mg/m ³

Predicted No Effect Concentration (PNEC)

Fresh water	:	0.0126 mg/l
Marine water	:	0.0126 mg/l
Intermittent releases	:	0.0138 mg/l
Sediment	:	0.047 mg/kg dwt
Soil	:	0.0019 mg/kg
Sewage treatment plant (STP)	:	4.66 mg/l

Component:	CAS-No.
	7722-84-1

Other Occupational Exposure Limit Values

Hydrogen Peroxide 35 - <50%

EH40 WEL, Time Weighted Average (TWA):
1 ppm, 1.4 mg/m³

EH40 WEL, Short Term Exposure Limit (STEL):
2 ppm, 2.8 mg/m³

ELV (IE), Short Term Exposure Limit (STEL):
2 ppm, 3 mg/m³

ELV (IE), Time Weighted Average (TWA):
1 ppm, 1.5 mg/m³

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice : Use respirator with appropriate filter if vapours or aerosol are released.
Combination filter:NO-P3

Hand protection

Advice : Wear suitable gloves.
The following materials are suitable:
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material : butyl-rubber
Break through time : >= 8 h
Glove thickness : 0.5 mm

Material : natural rubber
Break through time : >= 8 h
Glove thickness : 0.5 mm

Material : polychloroprene
Break through time : >= 8 h
Glove thickness : 0.5 mm

Eye protection

Advice : Tightly fitting safety goggles

Skin and body protection

Advice : Wear suitable protective clothing.

Hydrogen Peroxide 35 - <50%

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system. Local authorities should be advised if significant spillages cannot be contained.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	: liquid
Colour	: colourless
Odour	: odourless
Odour Threshold	: no data available
pH	: 2 - 4 (20 °C)
Melting point/range	: ca. -50 °C
Boiling point/boiling range	: ca. 109 °C
Flash point	: not applicable
Evaporation rate	: no data available
Flammability (solid, gas)	: no data available
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: no data available
Relative vapour density	: no data available
Density	: ca. 1.2 g/cm ³ (20 °C)
Water solubility	: completely soluble
Partition coefficient: n-octanol/water	: log Kow -1.57 (25 °C) log Pow, calculated on the pure substance
Auto-ignition temperature	: no data available
Thermal decomposition	: no data available
Viscosity, dynamic	: no data available
Explosivity	: Product is not explosive.

Hydrogen Peroxide 35 - <50%

Oxidizing properties : no data available

9.2. Other information

No further information available.

Section 10: Stability and reactivity

10.1. Reactivity

Advice : Reacts with copper, aluminum, zinc and their alloys.

10.2. Chemical stability

Advice : No decomposition if stored and applied as directed.

10.3. Possibility of hazardous reactions

Hazardous reactions : Oxygen released on exothermic decomposition may support combustion in case of surrounding fire.

10.4. Conditions to avoid

Conditions to avoid : Keep away from direct sunlight.

10.5. Incompatible materials

Materials to avoid : Reducing agents, Metals, alkalis, Organic materials, Impurities, Combustible materials

10.6. Hazardous decomposition products

Hazardous decomposition products : Oxygen

Section 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Oral

LD50 : > 225 mg/kg (rat) (OECD Test Guideline 401)

Dermal

LD50 : > 2000 mg/kg (rabbit) (OECD Test Guideline 402)

Further information

Hydrogen Peroxide 35 - <50%

Other relevant toxicity information : Inhalation of aerosol may cause irritation to the upper respiratory tract.

Section 12: Ecological information

12.1. Toxicity

Component:	hydrogen peroxide solution	CAS-No. 7722-84-1
Acute toxicity		
Fish		
LC50	:	16.4 mg/l (Pimephales promelas; 96 h)
LC50	:	35 mg/l (Leuciscus idus melanotus; 24 h)
Toxicity to daphnia and other aquatic invertebrates		
EC50	:	7.7 mg/l (Daphnia magna; 24 h)
algae		
EC50	:	27.5 - 43 mg/l (scenedesmus quadricauda; 240 h)
Bacteria		
		11 mg/l (Pseudomonas putida; 16 h)

12.2. Persistence and degradability

Persistence and degradability		
Persistence		
Result	:	The product can be degraded by abiotic (e.g. chemical or photolytic) processes.

12.3. Bioaccumulative potential

12.4. Mobility in soil

Mobility		
Result	:	The product is mobile in water environment.

Hydrogen Peroxide 35 - <50%

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment

Result : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent nor very bioaccumulating (vPvB).
not applicable

12.6. Other adverse effects

Additional ecological information

Result : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.

Section 13: Disposal considerations

13.1. Waste treatment methods

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.

Contaminated packaging : Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. Packagings that cannot be cleaned are to be disposed of in the same manner as the product.

European Waste Catalogue Number : No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

Section 14: Transport information

14.1. UN number

2014

14.2. UN proper shipping name

ADR : HYDROGEN PEROXIDE, AQUEOUS SOLUTION
RID : HYDROGEN PEROXIDE, AQUEOUS SOLUTION
IMDG : HYDROGEN PEROXIDE, AQUEOUS SOLUTION

14.3. Transport hazard class(es)

ADR-Class : 5.1

Hydrogen Peroxide 35 - <50%

(Labels; Classification Code; Hazard identification No; Tunnel restriction code)	5.1, 8; OC1; 58; (E)
RID-Class	: 5.1
(Labels; Classification Code; Hazard identification No)	5.1, 8; OC1; 58
IMDG-Class	: 5.1
(Labels; EmS)	5.1, 8; F-H, S-Q

14.4. Packaging group

ADR	: II
RID	: II
IMDG	: II

14.5. Environmental hazards

Labeling according to 5.2.1.8 ADR	: no
Labeling according to 5.2.1.8 RID	: no
Labeling according to 5.2.1.6.3 IMDG	: no
Classification as environmentally hazardous according to 2.9.3 IMDG	: no
Classified as "P" according to 2.10 IMDG	: no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

Section 15: Regulatory information

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

hydrogen peroxide solution

EU. Regulation 648/2004, Annex VII, Content Labeling for Detergents
Threshold Concentration: 0.2 %

EU. Regulation No 1451/2007 [Biocides], Annex I, Active substances identified as existing (OJ (L 325)
Listed EC Number: 231-765-0

:

Notification status

hydrogen peroxide solution:

Regulatory List	Notification	Notification number
AICS	YES	

Hydrogen Peroxide 35 - <50%

DSL	YES	
INV (CN)	YES	
ENCS (JP)	YES	(1)-419
ISHL (JP)	YES	(1)-419
PHARM (JP)	YES	
TSCA	YES	
EINECS	YES	231-765-0
KECI (KR)	YES	97-1-2
KECI (KR)	YES	KE-20204
PICCS (PH)	YES	
IECSC	YES	

15.2. Chemical Safety Assessment

no data available

Section 16: Other information

Full text of R-phrases referred to under sections 2 and 3.

R 5	Heating may cause an explosion.
R 8	Contact with combustible material may cause fire.
R20/22	Harmful by inhalation and if swallowed.
R22	Harmful if swallowed.
R35	Causes severe burns.
R37/38	Irritating to respiratory system and skin.
R41	Risk of serious damage to eyes.

Full text of H-Statements referred to under sections 2 and 3.

H271	May cause fire or explosion; strong oxidiser.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Further information

Other information : Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text

|| Indicates updated section.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	3	4, 8, 9, 10, 11, 12, 14, 15, 16, 17	0, 1, 2, 8, 9a, 12, 14, 15, 20, 21, 23, 25, 26, 27, 29, 31, 32, 33, 34, 35, 37, 39	1, 2, 3, 4, 5, 7, 10, 12, 13, 14, 15	1, 2, 4, 6a, 6b, 6c, 6d	NA	ES142
2	Distribution of substance	3	4, 8, 9, 10, 11, 12, 14, 15, 16, 17	0, 1, 8, 12, 14, 15, 21, 25, 27, 29, 31, 32, 33, 34, 35, 37, 39	8a, 8b, 9	1, 2, 4, 6a, 6b, 6c	NA	ES278
3	Use in Cleaning Agents	22	NA	NA	4, 10, 11, 13, 19	8a, 8b, 8d, 8e	NA	ES400
4	Use in Cleaning Agents	21	NA	21, 35	NA	8a, 8b, 8d, 8e	NA	ES377
5	Use in agrochemicals	3	1, 2, 8	NA	1, 2, 3, 4	4, 6b	NA	ES327
6	Use in agrochemicals	22	1, 2, 8	NA	1, 2, 3, 4	8a, 8b, 8e, 8d	NA	ES362
7	Use in agrochemicals	21	1, 2, 8	20, 37	NA	8a, 8b, 8d, 8e	NA	ES366
8	Use as a bleach	3	5, 6b, 6a	NA	1, 2, 3, 4, 13, 19	4, 6b	NA	ES287
9	Use as a bleach	22	5, 6b, 6a	NA	1, 2, 3, 4, 13, 19	8a, 8b, 8e	NA	ES312
10	Use in cosmetics	22	NA	NA	19	8b	NA	ES404
11	Use as a bleach	21	5, 6b, 6a	23, 24, 26, 34	NA	8a, 8b, 8e	NA	ES316
12	Use in cosmetics	21	NA	39	NA	8b	NA	ES408

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1. Short title of Exposure Scenario 1: Manufacture of substance

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	<p>SU4: Manufacture of food products</p> <p>SU8: Manufacture of bulk, large scale chemicals (including petroleum products)</p> <p>SU9: Manufacture of fine chemicals</p> <p>SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)</p> <p>SU11: Manufacture of rubber products</p> <p>SU12: Manufacture of plastics products, including compounding and conversion</p> <p>SU14: Manufacture of basic metals, including alloys</p> <p>SU15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU16: Manufacture of computer, electronic and optical products, electrical equipment</p> <p>SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</p>
Chemical product category	<p>PC0: Other products:</p> <p>PC1: Adhesives, sealants</p> <p>PC2: Adsorbents</p> <p>PC8: Biocidal products</p> <p>PC9a: Coatings and paints, thinners, paint removers</p> <p>PC12: Lawn and garden preparations, including fertilizers (- Fertilizers)</p> <p>PC14: Metal surface treatment products, including galvanic and electroplating products</p> <p>PC15: Non-metal-surface treatment products</p> <p>PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents</p> <p>PC21: Laboratory chemicals</p> <p>PC23: Leather tanning, dye, finishing, impregnation and care products</p> <p>PC25: Metal working fluids</p> <p>PC26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids</p> <p>PC27: Plant protection products</p> <p>PC29: Pharmaceuticals</p> <p>PC31: Polishes and wax blends</p> <p>PC32: Polymer preparations and compounds</p> <p>PC33: Semiconductors</p> <p>PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids</p> <p>PC35: Washing and cleaning products (including solvent based products)</p> <p>PC37: Water treatment chemicals</p> <p>PC39: Cosmetics, personal care products</p>
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p>

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PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
 PROC7: Industrial spraying
 PROC10: Roller application or brushing
 PROC12: use of blowing agents in manufacture of foam
 PROC13: Treatment of articles by dipping and pouring
 PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation
 PROC15: Use as laboratory reagent

Environmental Release Categories

ERC1: Manufacture of substances
 ERC2: Formulation of preparations
 ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
 ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
 ERC6b: Industrial use of reactive processing aids
 ERC6c: Industrial use of monomers for manufacture of thermoplastics
 ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

2.1 Contributing scenario controlling environmental exposure for: ERC1

Activity	Manufacture	
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 35% - 90 %
Amount used	Annual site tonnage (tons/year):	75000 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	7.000 m3/d
	Dilution Factor (River)	300
	Dilution Factor (Coastal Areas)	1.000
Other given operational conditions affecting environmental exposure	Number of emission days per year	360
	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,003 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Air	Passing of waste air through activated carbon filters
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by : , Biological wastewater treatment, ozonation or liquid phase carbon adsorption

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releases to soil
Organizational measures to prevent/limit release from the site

Conditions and measures related to external treatment of waste for disposal

Waste treatment

Waste has to be treated as industrial waste and should be incinerated in thermal combustion.

Highly reactive., Decomposition in the waste and during treatment., Seal and return containers., No environmental emissions are expected.

2.2 Contributing scenario controlling environmental exposure for: ERC6a

Activity	Chemical synthesis.	
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 35% - 90 %
Amount used	Annual site tonnage (tons/year):	8950 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	10.000 m3/d
	Dilution Factor (River)	40
	Dilution Factor (Coastal Areas)	400
Other given operational conditions affecting environmental exposure	Number of emission days per year	300
	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,007 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Passing of waste air through activated carbon filters
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by ; Biological wastewater treatment, ozonation or liquid phase carbon adsorption
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
		Highly reactive., Decomposition in the waste and during treatment., Seal and return containers., No environmental emissions are expected.

2.3 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6a, ERC6b, ERC6c, ERC6d

Activity	Chemical applications	
PA101212_003	4/39	EN

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Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 35% - 90 %
Amount used	Annual site tonnage (tons/year):	1010 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Number of emission days per year	300
	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,005 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Passing of waste air through activated carbon filters
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by : Biological wastewater treatment, ozonation or liquid phase carbon adsorption
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
		Highly reactive., Decomposition in the waste and during treatment., Seal and return containers., No environmental emissions are expected.

2.4 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC10, PROC12, PROC13, PROC14, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 35% - 90 %
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	220 days/year
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4, PROC5, PROC7, PROC10, PROC13, PROC14, PROC15)	
	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC12)	
Conditions and measures related	Wear protective gloves/ protective clothing/ eye protection/ face protection.	

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to personal protection, hygiene
and health evaluation

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	Manufacture	Fresh water	PEC	0,009mg/L	---
ERC6a	Chemical synthesis.	Fresh water	PEC	0,0063mg/L	---
ERC2, ERC4, ERC6a, ERC6b, ERC6c, ERC6d	Chemical applications	Fresh water	PEC	0,0086mg/L	---
ERC1	Manufacture	Marine water	PEC	0,0015mg/L	---
ERC6a	Chemical synthesis.	Marine water	PEC	0,0006mg/L	---
ERC2, ERC4, ERC6a, ERC6b, ERC6c, ERC6d	Chemical applications	Marine water	PEC	0,0008mg/L	---
ERC1	Manufacture	Soil	PEC	0,145µg/kg	---
ERC6a	Chemical synthesis.	Soil	PEC	0,151µg/kg	---
ERC2, ERC4, ERC6a, ERC6b, ERC6c, ERC6d	Chemical applications	Soil	PEC	0,117µg/kg	---
ERC1	Manufacture	Sewage treatment plant (STP)	PEC	0,63mg/L	---
ERC6a	Chemical synthesis.	Sewage treatment plant (STP)	PEC	0,146mg/L	---
ERC2, ERC4, ERC6a, ERC6b, ERC6c, ERC6d	Chemical applications	Sewage treatment plant (STP)	PEC	0,059mg/L	---

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	(90% w/w)	Inhalation worker exposure	0,014mg/m ³	---
PROC2	(90% w/w)	Inhalation worker exposure	0,142mg/m ³	---
PROC3	(70% w/w)	Inhalation worker exposure	0,298mg/m ³	---

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PROC4, PROC5, PROC15	(70% w/w)	Inhalation worker exposure	0,496mg/m ³	---
PROC7, PROC14	(60% w/w)	Inhalation worker exposure	0,425mg/m ³	---
PROC10	(60% w/w)	Inhalation worker exposure	0,85mg/m ³	---
PROC12	(60% w/w)	Inhalation worker exposure	0,34mg/m ³	---
PROC13	(60% w/w)	Inhalation worker exposure	0,85mg/m ³	---

Good industrial hygiene practice has to be followed if oral exposure is not expected for workers. Workers handling concentrated solutions containing 35% w/w or more are obliged to use appropriate dermal protection.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 2: Distribution of substance

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU4: Manufacture of food products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU11: Manufacture of rubber products SU12: Manufacture of plastics products, including compounding and conversion SU14: Manufacture of basic metals, including alloys SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Chemical product category	PC0: Other products: PC1: Adhesives, sealants PC8: Biocidal products PC12: Lawn and garden preparations, including fertilizers (- Fertilizers) PC14: Metal surface treatment products, including galvanic and electroplating products PC15: Non-metal-surface treatment products PC21: Laboratory chemicals PC25: Metal working fluids PC27: Plant protection products PC29: Pharmaceuticals PC31: Polishes and wax blends PC32: Polymer preparations and compounds PC33: Semiconductors PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC35: Washing and cleaning products (including solvent based products) PC37: Water treatment chemicals PC39: Cosmetics, personal care products
Process categories	PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

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ERC6b: Industrial use of reactive processing aids
 ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC6c

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 90%.
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Generally closed systems.
	Water	In case of leaks, wash away with plenty of water and flush to industrial wastewater treatment system., Do not release wastewater directly into environment.
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
		Highly reactive., Decomposition in the waste and during treatment., Seal and return containers., No environmental emissions are expected.

2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 90%.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	220 days/year
Technical conditions and measures to control dispersion from source towards the worker		Provide extraction ventilation at points where emissions occur.
		Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC8a, PROC9)
		Provide local exhaust ventilation (LEV). (Efficiency: 97 %)(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation		Wear protective gloves/ protective clothing/ eye protection/ face protection.

3. Exposure estimation and reference to its source

Environment

No environmental emissions are expected.

Workers

Used ECETOC TRA model.

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a	(70% w/w)	Inhalation worker exposure	0,99mg/m ³	---
PROC8b	(90% w/w)	Inhalation worker exposure	0,21mg/m ³	---
PROC9	(90% w/w)	Inhalation worker exposure	0,71mg/m ³	---

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 3: Use in Cleaning Agents

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC8e

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 12%
Amount used	Regional use tonnage (tons/year):	6210 ton(s)/year
	Annual amount per site	12,42 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,8 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	No specific measures identified.
	Water	Wastewater from professional and private cleaning should be sent to the public sewerage system where it will decompose
Conditions and measures related to external treatment of waste for disposal	Waste treatment	If container is empty, trash as regular municipal waste.
	Disposal methods	Dispose of via regular municipal waste.

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Highly reactive., Decomposition in the waste and during treatment., No environmental emissions are expected.

2.2 Contributing scenario controlling worker exposure for: PROC4, PROC10, PROC11, PROC13, PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 12%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	365 days/year
	Frequency of use	8 hours/day
	Frequency of use	220 days/year
	For a single worker	
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection.	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0037mg/L	---
---	Pulp bleaching	Marine water	PEC	0,294µg/L	---
---	Pulp bleaching	Soil	PEC	0,111µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,0095mg/L	---

Workers

ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
---	Spray cleaning, (7% w/w)	Inhalation worker exposure	0,002mg/m ³	---
---	Cleaning surfaces by wiping, brushing., (7% w/w)	Inhalation worker exposure	1,07mg/m ³	---
---	Sanitary cleaner, (12%)	Inhalation worker	1,16mg/m ³	---

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	w/w)	exposure		
---	Using cleaner containing H ₂ O ₂ , (7% w/w)	Inhalation worker exposure	1,07mg/m ³	---

Some products that are on the market contain more than 12% w/w It is recommended that consumers use gloves and safety glasses when handling pure or barely diluted products Good industrial hygiene practice has to be followed if oral exposure is not expected for workers.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 4: Use in Cleaning Agents

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC21: Laboratory chemicals PC35: Washing and cleaning products (including solvent based products)
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC8e

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 12%
Amount used	Regional use tonnage (tons/year):	6210 ton(s)/year
	Annual amount per site	12,42 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,8 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	No specific measures identified.
	Water	Wastewater from professional and private cleaning should be sent to the public sewerage system where it will decompose
Conditions and measures related to external treatment of waste for disposal	Waste treatment	If container is empty, trash as regular municipal waste.
	Disposal methods	Dispose of via regular municipal waste.
		Highly reactive., Decomposition in the waste and during treatment., No environmental emissions are expected.

2.2 Contributing scenario controlling consumer exposure for: PC21, PC35

Product characteristics	Concentration of the	Covers concentrations up to 12%
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	Substance in Mixture/Article	
	Physical Form (at time of use)	liquid
Amount used	Covers concentrations up to	0,11 kg
Frequency and duration of use	Exposure duration per event	20 min
	Frequency of use	365 days/year
	Frequency of use	1 Times per day

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0037mg/L	---
---	Pulp bleaching	Marine water	PEC	0,294µg/L	---
---	Pulp bleaching	Soil	PEC	0,111µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,0095mg/L	---

Consumers

ConsExpo 4.1 (Consumer inhalation exposure).

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
---	Spray cleaning, (7% w/w)	Consumer inhalation exposure	0,002mg/m ³	---
---	Cleaning surfaces by wiping, brushing., (7% w/w)	Consumer inhalation exposure	1,07mg/m ³	---
---	Sanitary cleaner, (16% w/w)	Consumer inhalation exposure	1,16mg/m ³	---

Consumers normally do not come into contact with products containing more than 12% w/w of the substance It is recommended that consumers use gloves and safety glasses when handling pure or barely diluted products Under normal conditions of use oral exposure to bleaches can be neglected

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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For scaling see: <http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp>
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

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1. Short title of Exposure Scenario 5: Use in agrochemicals

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU1: Agriculture, forestry, fishery SU2: Mining (including offshore industries) SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6b

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Amount used	Regional use tonnage (tons/year):	2645 ton(s)/year
	Annual amount per site	4,93 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,1 %
	Emission or Release Factor: Water	0,05 %
	Emission or Release Factor: Soil	0,8 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	No specific waste treatment required/proposed

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.	
	Route of Exposure	Inhalation exposure (PROC3, PROC4)
	Application Area	Industrial use (PROC3, PROC4)

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Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC3, PROC4)	
Route of Exposure	Inhalation exposure (PROC3, PROC4)
Application Area	Industrial use (PROC3, PROC4)

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

Wear protective gloves/ protective clothing/ eye protection/ face protection.	
Route of Exposure	Inhalation exposure (PROC3, PROC4)
Application Area	Industrial use (PROC3, PROC4)
Wear respiratory protection (Efficiency: 90 %)(PROC3, PROC4)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0085mg/L	---
---	Pulp bleaching	Marine water	PEC	0,775µg/L	---
---	Pulp bleaching	Soil	PEC	0,113µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,088mg/L	---

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	(50% w/w), Indoor use.	Inhalation worker exposure	0,007mg/m ³	---
PROC2	(50% w/w), Indoor use.	Inhalation worker exposure	0,708mg/m ³	---
PROC3	(50% w/w), Indoor use.	Inhalation worker exposure	0,213mg/m ³	---
PROC4	(50% w/w), Indoor use.	Inhalation worker exposure	0,354mg/m ³	---
PROC1	(50% w/w), Outdoor use.	Inhalation worker exposure	0,005mg/m ³	---
PROC2	(50% w/w), Outdoor use.	Inhalation worker exposure	0,496mg/m ³	---
PROC3	(50% w/w), Outdoor use.	Inhalation worker exposure	0,149mg/m ³	---
PROC4	(50% w/w), Outdoor use.	Inhalation worker exposure	0,248mg/m ³	---

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Workers handling concentrated solutions containing 35% w/w or more are obliged to use appropriate dermal protection. Good industrial hygiene practice has to be followed if oral exposure is not expected for workers.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 6: Use in agrochemicals

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU1: Agriculture, forestry, fishery SU2: Mining (including offshore industries) SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC8e

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Amount used	Regional use tonnage (tons/year):	2645 ton(s)/year
	Annual amount per site	4,93 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,1 %
	Emission or Release Factor: Water	0,05 %
	Emission or Release Factor: Soil	0,8 %

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.	
	Route of Exposure	Inhalation exposure (PROC3, PROC4)
	Application Area	Industrial use (PROC3, PROC4)
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC3, PROC4)	
	Route of Exposure	Inhalation exposure (PROC3, PROC4)

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	Application Area	Industrial use (PROC3, PROC4)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection.	
	Route of Exposure	Inhalation exposure (PROC3, PROC4)
	Application Area	Industrial use (PROC3, PROC4)
	Wear respiratory protection (Efficiency: 90 %)(PROC3, PROC4)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0085mg/L	---
---	Pulp bleaching	Marine water	PEC	0,775µg/L	---
---	Pulp bleaching	Soil	PEC	0,113µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,088mg/L	---

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Inhalation worker exposure	0,007mg/m ³	---
PROC2	(50% w/w)	Inhalation worker exposure	0,708mg/m ³	---
PROC3	(50% w/w)	Inhalation worker exposure	0,213mg/m ³	---
PROC4	(50% w/w)	Inhalation worker exposure	0,354mg/m ³	---
PROC1	(50% w/w)	Inhalation worker exposure	0,005mg/m ³	---
PROC2	(50% w/w)	Inhalation worker exposure	0,496mg/m ³	---
PROC3	(50% w/w)	Inhalation worker exposure	0,149mg/m ³	---
PROC4	(50% w/w)	Inhalation worker exposure	0,248mg/m ³	---

Good industrial hygiene practice has to be followed if oral exposure is not expected for workers. Workers handling concentrated solutions containing 35% w/w or more are obliged to use appropriate dermal protection.

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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 7: Use in agrochemicals

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU1: Agriculture, forestry, fishery SU2: Mining (including offshore industries) SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Chemical product category	PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents PC37: Water treatment chemicals
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC8e

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Amount used	Regional use tonnage (tons/year):	2645 ton(s)/year
	Annual amount per site	4,93 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,1 %
	Emission or Release Factor: Water	0,05 %
	Emission or Release Factor: Soil	0,8 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	No specific waste treatment required/proposed

2.2 Contributing scenario controlling consumer exposure for: , PC20, PC37

No consumer exposure anticipated

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 50%

3. Exposure estimation and reference to its source

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Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0085mg/L	---
---	Pulp bleaching	Marine water	PEC	0,775µg/L	---
---	Pulp bleaching	Soil	PEC	0,113µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,088mg/L	---

Consumers

No consumer exposure anticipated

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

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1. Short title of Exposure Scenario 8: Use as a bleach

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU6a: Manufacture of wood and wood products
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6b

Activity	Pulp bleaching	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Amount used	Regional use tonnage (tons/year):	43600 ton(s)/year
	Annual amount per site	9810 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	17.500 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Number of emission days per year	360
	Emission or Release Factor: Air	0,001 %
	Emission or Release Factor: Water	0,009 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Air	Optional passing of waste air through activated carbon filters.
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by : , Biological wastewater treatment, ozonation or liquid phase carbon adsorption

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releases to soil
Organizational measures to prevent/limit release from the site

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
Highly reactive., Seal and return containers., No environmental emissions are expected.	

2.2 Contributing scenario controlling environmental exposure for: ERC4, ERC6b

Activity	Other bleaching	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Amount used	Regional use tonnage (tons/year):	43600 ton(s)/year
	Annual amount per site	9810 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Number of emission days per year	300
	Emission or Release Factor: Air	0,001 %
	Emission or Release Factor: Water	0,009 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Optional passing of waste air through activated carbon filters.
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by ; Biological wastewater treatment, ozonation or liquid phase carbon adsorption
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
	Highly reactive., Seal and return containers., No environmental emissions are expected.	

2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC13, PROC19

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Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	220 days/year
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.	
	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC2, PROC3, PROC4, PROC13)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection.	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0098mg/L	---
---	Pulp bleaching	Marine water	PEC	0,001mg/L	---
---	Pulp bleaching	Soil	PEC	0,154µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,098mg/L	---
---	Other bleaching	Fresh water	PEC	0,004mg/L	---
---	Other bleaching	Marine water	PEC	0,0004mg/L	---
---	Other bleaching	Soil	PEC	0,128µg/kg	---
---	Other bleaching	Sewage treatment plant (STP)	PEC	0,042mg/L	---

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	(35% w/w)	Inhalation worker exposure	0,005mg/m ³	---
PROC2	(35% w/w)	Inhalation worker exposure	0,05mg/m ³	---
PROC3	(35% w/w)	Inhalation worker exposure	0,149mg/m ³	---
PROC4	(35% w/w)	Inhalation worker	0,248mg/m ³	---

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		exposure		
PROC13	(35% w/w)	Inhalation worker exposure	0,496mg/m ³	---

Good industrial hygiene practice has to be followed if oral exposure is not expected for workers. Workers handling concentrated solutions containing 35% w/w or more are obliged to use appropriate dermal protection.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 9: Use as a bleach

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU6a: Manufacture of wood and wood products
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8e

Activity	Pulp bleaching	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Amount used	Regional use tonnage (tons/year):	43600 ton(s)/year
	Annual amount per site	9810 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	17.500 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
	Other data. Other information	Pulp bleaching:
Other given operational conditions affecting environmental exposure	Number of emission days per year	360
	Emission or Release Factor: Air	0,001 %
	Emission or Release Factor: Water	0,009 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and	Air	Optional passing of waste air through activated carbon filters.
	Water	Optional pre-treatment of wastewater by steam

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measures to reduce or limit discharges, air emissions and releases to soil
Organizational measures to prevent/limit release from the site

	stripping, must be treated by : Biological wastewater treatment, ozonation or liquid phase carbon adsorption
--	--

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
Highly reactive., Seal and return containers., No environmental emissions are expected.	

2.2 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8e

Activity	Other bleaching	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Amount used	Regional use tonnage (tons/year):	43600 ton(s)/year
	Annual amount per site	9810 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Number of emission days per year	300
	Emission or Release Factor: Air	0,01 %
	Emission or Release Factor: Water	0,009 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Optional passing of waste air through activated carbon filters.
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by : Biological wastewater treatment, ozonation or liquid phase carbon adsorption
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
	Highly reactive., Seal and return containers., No environmental emissions are expected.	

2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4,

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PROC13, PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	220 days/year
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.	
	Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC2, PROC3, PROC4, PROC13, PROC19)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection.	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0098mg/L	---
---	Pulp bleaching	Marine water	PEC	0,001mg/L	---
---	Pulp bleaching	Soil	PEC	0,154µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,098mg/L	---
---	Other bleaching	Fresh water	PEC	0,004mg/L	---
---	Other bleaching	Marine water	PEC	0,0004mg/L	---
---	Other bleaching	Soil	PEC	0,128µg/kg	---
---	Other bleaching	Sewage treatment plant (STP)	PEC	0,042mg/L	---

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	(35% w/w)	Inhalation worker exposure	0,005mg/m ³	---
PROC2	(35% w/w)	Inhalation worker exposure	0,496mg/m ³	---
PROC3	(35% w/w)	Inhalation worker exposure	0,298mg/m ³	---

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PROC4	(35% w/w)	Inhalation worker exposure	0,992mg/m ³	---
PROC13	(35% w/w)	Inhalation worker exposure	0,34mg/m ³	---
PROC19	(35% w/w)	Inhalation worker exposure	0,85mg/m ³	---

Workers handling concentrated solutions containing 35% w/w or more are obliged to use appropriate dermal protection. Good industrial hygiene practice has to be followed if oral exposure is not expected for workers.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 10: Use in cosmetics

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 18%
Amount used	Regional use tonnage (tons/year):	6210 ton(s)/year
	Annual amount per site	12,42 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,8 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	No specific measures identified.
	Water	Wastewater from professional and private cleaning should be sent to the public sewerage system where it will decompose
Conditions and measures related to external treatment of waste for disposal	Disposal methods	If container is empty, trash as regular municipal waste., Dispose of via regular municipal waste.
		Highly reactive., Decomposition in the waste and during treatment., No environmental emissions are expected.

2.2 Contributing scenario controlling worker exposure for: PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 18%
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Frequency and duration of use	Intermittent use/release
Technical conditions and measures to control dispersion from source towards the worker	Provide extraction ventilation at points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear protective gloves/ protective clothing/ eye protection/ face protection.

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0037mg/L	---
---	Pulp bleaching	Marine water	PEC	0,294µg/L	---
---	Pulp bleaching	Soil	PEC	0,111µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,0095mg/L	---

Workers

Not to be assessed

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Environment

Estimated exposures are not expected to exceed PNEC when the identified Risk Management Measures / Operational Conditions are adopted, as indicated in Section 2

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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1. Short title of Exposure Scenario 11: Use as a bleach

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU6a: Manufacture of wood and wood products
Chemical product category	PC23: Leather tanning, dye, finishing, impregnation and care products PC24: Lubricants, greases, release products PC26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8e

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Amount used	Regional use tonnage (tons/year):	43600 ton(s)/year
	Annual amount per site	9810 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	17.500 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Number of emission days per year	360
	Emission or Release Factor: Air	0,001 %
	Emission or Release Factor: Water	0,009 %
	Emission or Release Factor: Soil	0 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
	Highly reactive., Seal and return containers., No environmental emissions are expected.	

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8e

Activity	Other bleaching	
Product characteristics	Concentration of the	Covers concentrations up to 35%

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	Substance in Mixture/Article	
Amount used	Regional use tonnage (tons/year):	43600 ton(s)/year
	Annual amount per site	9810 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Number of emission days per year	300
	Emission or Release Factor: Air	0,01 %
	Emission or Release Factor: Water	0,009 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Optional passing of waste air through activated carbon filters.
	Water	Optional pre-treatment of wastewater by steam stripping, must be treated by : Biological wastewater treatment, ozonation or liquid phase carbon adsorption
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste has to be treated as industrial waste and should be incinerated in thermal combustion.
		Highly reactive., Seal and return containers., No environmental emissions are expected.

2.3 Contributing scenario controlling consumer exposure for: PC23, PC24, PC26, PC34

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 35%
Amount used	Amount used per event	0,1 l
Frequency and duration of use	Exposure duration per event	10 min
	Frequency of use	4 events/week

3. Exposure estimation and reference to its source

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Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0098mg/L	---
---	Pulp bleaching	Marine water	PEC	0,001mg/L	---
---	Pulp bleaching	Soil	PEC	0,154µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,098mg/L	---
---	Other bleaching	Fresh water	PEC	0,004mg/L	---
---	Other bleaching	Marine water	PEC	0,0004mg/L	---
---	Other bleaching	Soil	PEC	0,128µg/kg	---
---	Other bleaching	Sewage treatment plant (STP)	PEC	0,042mg/L	---

Consumers

Based on EU Risk Assessment Report, European Commission 2003

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
---	---	Consumer inhalation exposure	0,13mg/m ³	---

Under normal conditions of use oral exposure to bleaches can be neglected Consumers normally do not come into contact with products containing more than 12% w/w of the substance Some products that are on the market contain more than 12% w/w It is recommended that consumers use gloves and safety glasses when handling pure or barely diluted products

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

If the local conditions deviate significantly from the values in the EU RAR, then further site specific evaluation is required
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

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1. Short title of Exposure Scenario 12: Use in cosmetics

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC39: Cosmetics, personal care products
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems
Activity	Use for hair bleaching and dyeing and tooth bleaching

2.1 Contributing scenario controlling environmental exposure for: ERC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 18%
Amount used	Regional use tonnage (tons/year):	6210 ton(s)/year
	Annual amount per site	12,42 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	2.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,8 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	No specific measures identified.
	Water	Wastewater from professional and private cleaning should be sent to the public sewerage system where it will decompose
Conditions and measures related to external treatment of waste for disposal	Disposal methods	If container is empty, trash as regular municipal waste., Dispose of via regular municipal waste.
		Highly reactive., Decomposition in the waste and during treatment., No environmental emissions are expected.

2.2 Contributing scenario controlling consumer exposure for: PC39

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 18%
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Physical Form (at time of use)	liquid
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Frequency and duration of use	Intermittent use/release
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3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	Pulp bleaching	Fresh water	PEC	0,0037mg/L	---
---	Pulp bleaching	Marine water	PEC	0,294µg/L	---
---	Pulp bleaching	Soil	PEC	0,111µg/kg	---
---	Pulp bleaching	Sewage treatment plant (STP)	PEC	0,0095mg/L	---

Consumers

No consumer exposure anticipated

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES



PRODUCT SPECIFICATION

Product Name	Hydrogen Peroxide
Alternative Name	
Product Grade	
Specification Reference	HYPE/3 (08/05/R19/12/IHSK)

SALES SPECIFICATION

	27.5% m/m (100 vol)	35% m/m (130 vol)	50% m/m (180 vol)
Physical Description	Clear liquid with characteristic odour and free from visible impurities	Clear liquid with characteristic odour and free from visible impurities	Clear liquid with characteristic odour and free from visible impurities
Strength (as H ₂ O ₂ , % m/m) (as H ₂ O ₂ , g/kg)	27.3 - 28.0 273 - 280	34.8 - 35.6 348 - 356	49.2 - 49.9 492 - 499
Chloride (as Cl, mg/l)	10 maximum	10 maximum	10 maximum
Colour (Hazen)	10 maximum	15 maximum	20 maximum
Non Volatile Matter (mg/l at 105°C)	1000 maximum	1000 maximum	1000 maximum

NOTES

Exclusion of Liability

Information contained in this publication is accurate to the best of the knowledge and belief of Tennants.

Any information or advice obtained from Tennants otherwise than by means of this publication and whether relating to Tennants materials or other materials, is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that Tennants materials are suitable for the particular purpose intended.

Tennants accepts no liability whatsoever (except as otherwise provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of Tennants materials or the use of Tennants materials in conjunction with such other materials.

Health and Safety

A Material Safety Data Sheet has been issued describing the health, safety and environmental properties of this product, identifying the potential hazards and giving advice on the handling precautions and emergency procedures. This must be consulted fully before handling, storage and use.



SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

1.1 Product Identifier

Chemical Name (EINECS)	Hydrogen Peroxide
Trade Names	Hyprox®
CAS Number	7722-84-1
EINECS Number	231-765-0
REACH Registration Number	01-2119485845-22-XXXX

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

Identified use(s)	For industrial use For oxidation
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1.3 Details of the supplier of the safety data sheet

Tennants Distribution Limited
Hazelbottom Road
Cheetham
Manchester
M8 0GR
Tel: 44(0)161 205 4454
Fax: 44(0) 161 203 4298
Email: msds@tennantsdistribution.com

1.4 Emergency telephone number

Tel: 44(0) 844 3350001 (24 hours)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Regulation 1272/2008 (CLP)

Acute toxicity (oral)	Category 4	H302
Skin corrosion/irritation	Category 2	H315
Serious eye damage/eye irritation	Category 1	H318
Specific Target organ Toxicity- Single exposure	Category 3	H335

2.2 Label elements

2.2.1 According to Regulation (EC) No. 1272/2008 (CLP).

Hydrogen Peroxide

Hazard Pictogram



Signal word(s) Danger.

Hazard statement(s)

H302	Harmful if swallowed
H315	Causes skin irritation
H318	Causes serious eye damage.
H335	May cause respiratory irritation.

Precautionary statement(s)

Prevention

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary Statements

Reaction

P301 + P312	IF SWALLOWED: Call a POISON CENTRE or doctor/physician if you feel unwell.
P302 + P352	IF ON SKIN: wash with plenty of soap and water.
P305 + P351+ P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
P304 + P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.



2.3 Other hazards

Classification of the substance or mixture

EEC Directive 67/548/EEC & Directive 1999/45/EC

Other hazards

Product is a strong oxidising agent

Danger of decomposition under influence of heat

Risk of decomposition in contact with incompatible substances, impurities, metals, alkalis, reducing agents

Risk of explosion with organic solvents

See also section 10

Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Nature

Aqueous solution, clear Content: 35% - 50%

Information on ingredients/hazardous components as per EU CLP Regulation (EC) No.1272/2008

CAS Number	EINECS Number	REACH registration number	Classification according to Regulation 1272/2008
7722-84-1	231-765-0	01-2119485845-22-XXXX	Oxidising Liquids-Category 1-H271 Acute toxicity (inhalation)-Category 4-H332 Acute toxicity (oral)-Category 4-H302 Skin corrosion-Category 1A-H314R5.

Remarks: Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

See section 16 for the full text of the H-phrases declared above

4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice

Pay attention to self protection

Remove victims from hazardous area. Immediately removed soiled or soaked clothing and remove it to a safe distance. Keep victim warm, in a stabilised position and covered.

Do not leave victims unattended

If the casualty is conscious: Place the victim in the recovery position

Inhalation

Potential for exposure by inhalation if aerosols or mists are generated

Move victims to fresh air

With laboured breathing: Provide with oxygen. Consult a doctor

If the casualty is not breathing: Perform mouth to mouth resuscitation, notify emergency physician immediately

Skin contact

Wash off affected area immediately with plenty of water for at least 15 minutes

If symptoms persist, consult a physician for treatment

Eye contact

With eye held open, thoroughly rinse immediately with plenty of water for at least 10 minutes

Consult an ophthalmologist immediately if the symptoms persist

When dealing with caustic substances, notify emergency physician immediately (key words: burn in the eye)

Ingestion

Rinse out mouth

Immediately give large quantities of water to drink

Consult a physician immediately

When dealing with caustic substances, notify emergency physician immediately

4.2 Most important symptoms and effects, both acute and delayed

4.3 Indication of any immediate medical attention and special treatment needed

The initial focus is on the local action, characterised by quickly progressing deep tissue damage. In the eye, caustic/irritating and harmful liquids cause, depending on the intensity of the exposure, various levels of irritation, destruction and ablation of the epithelium of the conjunctiva and corneal clouding, oedema and ulcerations

Danger! Possible loss of eyesight!

Superficial irritations and damage to ulcerations and scarring develop on the skin. After accidental absorption in the body, the pathology and clinical findings are dependent on the kinetics of the substance (quantity of absorbed substance, the absorption time, and the effectiveness of early elimination measures (first aid/excretion – metabolism)

A specific action of the substance is unknown

In case of substances with high water solubility, irritations up to formation of necrosis in the upper respiratory tract may result after inhalation of caustic/irritating aerosols and mists



The initial focus is on the local action: Signs of irritation of the respiratory tract such as coughing, burning behind the sternum, tears, burning in the eyes or nose
There is risk of pulmonary oedema!

5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media

Suitable extinguishing media: Water spray, dry powder, carbon dioxide (CO₂)

5.2 Special hazards arising from the substance or mixture

Product is fire-stimulating

Contact with the following substances may cause inflammation: flammable substances

The product itself does not burn

Involved in a fire, it may decompose yielding oxygen

Risk of overpressure and burst due to decomposition in confined spaces and pipes

Release of oxygen may support combustion

5.3 Advice for fire-fighters

Special protective equipment for fire-fighters: In case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit

Further advice: Evacuate personnel to safe areas. Keep out unprotected persons. Keep unauthorised persons away. With large-scale fire, violent decomposition or even explosion is possible. In case of fire, cool the containers that are at risk with water or dilute with water (flooding) or in case of fire, remove the endangered containers and bring to a safe place, if this can be done safely. Ensure there are sufficient retaining facilities for water used to extinguish fire.

Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities

Fire residues should be disposed of in accordance with the regulations

Water used to extinguish fire should not enter drainage systems, soil or stretches of water

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Product causes chemical burns. Wear personal protection, see Section 8

Evacuate personnel to safe areas. Keep out unprotected personnel. Keep unauthorised personnel away

6.2 Environmental precautions

Observe regulations on prevention of water pollution (check, dam up, cover up)

Dam with sand or earth

Do not use: textiles, sawdust, combustible substances

Do not permit to enter into surface water, stretches of water, soil undiluted

6.3 Methods and material for containment and cleaning up.

In case of larger quantities:

Collect product in suitable containers (e.g. made of plastic) using appropriate equipment (e.g. liquid pump). Keep away from flammable substances. Keep away from incompatible substances. Rinse away any residue with plenty of water. Dispose of absorbed material in accordance with the regulations

With small amounts:

Dilute product with lots of water and rinse away – or – absorb with liquid binding material e.g. diatomaceous earth or universal binder. Pick up mechanically. Collect in suitable containers. Clean contaminated surface thoroughly. Waste to be packed like clean product and to be marked. Identification label on packages not to be removed until recycling

Additional advice:

Make safe or remove all sources of ignition. Shut off leak, if possible and safe to do. Isolate defective containers immediately, if possible and safe to do so. Place defective containers in waste receptacle (waste packaging receptacle) made of plastic (not metal). Do not seal defective containers or waste receptacles airtight (danger of bursting due to product decomposition)

Never return spilled product into its original container for re-use (risk of decomposition)

6.4 Reference to other sections

For personal protection see Section 8

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practices.

Avoid impurities and heat effect.

Ensure there is good room ventilation.

Avoid contact with skin, eyes and clothing.

Do not inhale vapour, aerosols, mist.

Wear personal protective equipment.

For personal protection see section 8.

Immediately change moistened and saturated work clothes.



Immediately rinse contaminated or saturated clothing with water.
Provide for installation of emergency shower and eye bath.
Set up safety and operation procedures.
Never return spilled product into its original container for re-use. (Risk of decomposition.).

Advice on protection against fire and explosion

Avoid sun rays, heat, heat effect.
Keep away from sources of ignition - No smoking.
Keep away from flammable substances.
Keep away from incompatible substances.

7.2 Conditions for safe storage, including any incompatibilities

cool, dry, clean.
well ventilated
Jointless smooth concrete floor.
Recommendation: Acid-proof floor.
Only use containers which are specially permitted for: hydrogen peroxide and/or
For transport, storage and tank installations only use suitable materials.
Use adequate venting devices on all packages, containers and tanks and check correct operation periodically.
Do not confine product in unvented vessels or between closed valves.
Risk of overpressure and burst due to decomposition in confined spaces and pipes.
Packages, containers and tanks should regularly be checked by visual observation for any sign of abnormality, e.g. corrosion, exert pressure (bulging), temperature increase etc.
Transport and store container in upright position only.
Always close container tightly after removal of product.
Do not keep the container sealed.
Ensure tightness at all times. Avoid leakage.
Avoid residues of the product on the containers..

Suitable materials	vanadium steel: 1.4571 or 1.4541, passivated
Suitable materials	aluminium: min. 99.5 % passivated
Suitable materials	aluminium magnesium alloys, passivated
Suitable materials	polyethylene, polypropylene, polyvinyl chloride (PVC),
Suitable materials	polytetrafluoroethylene
Suitable materials	glass, ceramics
Unsuitable materials	iron, mild steel, copper, bronze, brass, zinc, tin

Advice for fire-fighters

Measures for storing in tank installations. These should include at least:
Compatible materials, adequate separation, adequate venting area, venting devices, temperature measurement, earthing (grounding), bund in case of leakage.
Prior to the first filling and operation of a tank installation all parts of the facility including all pipes must be thoroughly cleaned and flushed through.
Metal elements of the installation must first be pickled and passivated sufficiently.

For detailed information on design specifications for the construction of tank- and dosing installations ask the producer for advice.
Regularly verify the availability of water to deal with emergencies (for cooling, tank flooding, fire fighting) and check correct operation periodically.

Advice on common storage
Do not store together with: alkalis, reductants, metallic salts (risk of decomposition).
Do not store together with: inflammable substances (risk of fire).
Do not store together with: organic solvents (risk of explosion).

7.3 Specific end use(s)

Consult the technical guidelines for the use of the substance/mixture

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters - Hydrogen Peroxide

CAS Number	EC Number	Control Parameters	Update Basis
7722-84-1	231-765-0	1 ppm 1.4 mg/m ³	Time ~Weighted Average (TWA): (EH40 WEL)



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7722-84-1	231-765-0	2 ppm 2.8 mg/m ³	Short Term Exposure Limit (STEL): (EH40 WEL)
<p>DNEL/DMEL values</p> <p>End Use Worker</p> <p>Routes of exposure Inhalation</p> <p>Possible health damage Acute- local effects</p> <p>Value 3mg/m³</p> <p>End Use Worker</p> <p>Routes of exposure Inhalation</p> <p>Possible health damage Long term-systemic effects</p> <p>Value 1.4mg/m³</p> <p>End Use Consumers</p> <p>Routes of exposure Inhalation</p> <p>Possible health damage Acute- local effects</p> <p>Value 1.93mg/m³</p> <p>End Use Consumers</p> <p>Routes of exposure Inhalation</p> <p>Possible health damage Long term- local effects</p> <p>Value 0.21mg/m³</p> <p>PNEC values</p> <p>Freshwater</p> <p>Value 0.0126mg/l</p> <p>Marine water</p> <p>Value 0.0126mg/l</p> <p>Water-intermittent release</p> <p>Value 0.0138mg/l</p> <p>Sewage treatment plant</p> <p>Value 4.66 mg/l</p> <p>Fresh water sediment</p> <p>Value 0.47 mg/kg (dry weight)</p> <p>Marine water sediment</p> <p>Value 0.47 mg/kg (dry weight)</p> <p>Soil</p> <p>Value 0.0023 mg/kg (dry weight)</p>			
<p>8.2 Exposure controls</p> <p>Appropriate engineering controls</p> <p>Ensure suitable suction/aeration at the work place and with operational machinery. Provide for installation of emergency shower and eye bath.</p> <p>Suitable measuring processes are:</p> <p>OSHA method ID 006</p> <p>OSHA method VI-6</p>			
<p>Respiratory protection</p> <p>If workplace exposure limit is exceeded apply Respiratory protective equipment.</p> <p>If open handling is unavoidable:</p> <p>Wear respiratory protection.</p> <p>If necessary: Provide with fresh air.</p> <p>If necessary: Local ventilation.</p> <p>When handling for a short time:</p> <p>Suitable filter: Type NO-P3, code colour blue-white</p> <p>in the event of prolonged exposure during handling:</p> <p>self-contained breathing apparatus (EN 133)</p> <p>Note time limit for wearing respiratory protective equipment.</p>			
<p>Hand protection</p> <p>Wear suitable gloves</p> <p>Gloves material</p> <p>butyl-rubber, for example: Butoject 898, Kachele-Carna Latex GmbH (KCL), Germany</p> <p>Material thickness: 0.7 mm. Breakthrough time: >480 min. Method: DIN EN 374. Glove material: Natural rubber (NR) for example: Combi latex 395, Kachele-Cama Latex GmbH (KCL), Germany</p> <p>Material thickness: 1 mm. Breakthrough time: >480 min. Method: DIN EN 374. Glove material: Nitrile, for example: Camartril 731, Kachele-Cama Latex GmbH (KCL), Germany</p> <p>Material thickness: 0.33 mm. Breakthrough time: >480 min. Method DIN EN 374</p>			



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Eye protection	
Safety glasses with side shields conforming to EN 166 Or when handling larger quantities: basket shaped glasses	
Skin protection	
Wear protective clothing, acid-proof. Suitable materials are: PVC, neoprene, nitrile rubber (NBR), rubber. Rubber or plastic boots	
Hygiene Measures	
Do not inhale vapour, aerosols, mist Avoid contact with skin, eyes and clothing Ensure there is good room ventilation The work place related airborne concentrations have to be kept below of the indicated exposure limits. If the limits at the workplace are exceeded and/or larger amounts are released (leakage, spilling, etc) the indicated respiratory protection should be used No eating, drinking, smoking or snuffing tobacco at work should be used Wash face and/or hands before breaks and end of work Use preventative skin protection Avoid contaminating clothes with product Immediately change moistened and saturated work clothing Immediately rinse contaminated or saturated clothing with water Any contaminated protective equipment to be cleaned after use	
Protective Measures	
Handle in accordance with good industrial hygiene and safety practices Wear suitable protective clothing, gloves and eye/face protection Avoid protective gloves, clothes and shoes made from the following materials: Leather The personal protective equipment used must meet the requirements of directive 89/686/EEC and amendments (CE certification) It should be defined in the workplace in the form of a risk analysis according to directive 89/686/EEC and amendments	
9. PHYSICAL AND CHEMICAL PROPERTIES	
9.1 Information on basic physical and chemical properties (Hydrogen Peroxide 50% values unless otherwise stated)	
Appearance	Liquid
Colour	Colourless
Odour	Stinging
Odour threshold	No data available
pH – Medium: Product	>1 - 3(20°C) (Hydrogen Peroxide 35% <=3.5 (20°C))
Melting point/range	-52.2°C (Hydrogen Peroxide 35% -33°C)
Boiling point/ range	ca.114°C (Hydrogen Peroxide 35% approx. 108°C)
Flash point	Not combustible
Evaporation rate	No data available
Flammability (solid, gas)t	Not flammable
Auto inflammability	Not spontaneously flammable
Thermal decomposition	No data available
Oxidising properties	No data available
Explosiveness	Not explosive
Lower Explosion Limit	No data available
Upper Explosion Limit	No data available
Vapour pressure	2.99hPa (25°C) Related to substance: Hydrogen Peroxide 100%
Density	1.196 g/cm ³ (20°C) (Hydrogen Peroxide 35% 1.132 g/cm ³ (20°C))
Relative density	1.1914 (25°C) (Hydrogen Peroxide 35% 1.1282 (25°C))
Water solubility	miscible
Partition co-efficient (n-octanol/water)	Log Pow: Method: Calculated 157 Related to substance: Hydrogen Peroxide100%
Viscosity, dynamic	1.17 mPas (20°C) (Hydrogen Peroxide 35% 1.11 mPa.s (20°C))
Vapour density	No data available
Molecular weight	34.02 g/Mol
9.2 Further information	
Miscibility in water	Completely miscible
Surface tension	Ca.75.68 mN.m (20°C)
Other information	Strong Oxidising agent



10. STABILITY AND REACTIVITY
10.1 Reactivity No data available
10.2 Chemical stability Stable under recommended storage conditions
10.3 Possibility of hazardous reactions Product is a strong oxidising agent and reactive. Commercial products are stabilised to reduce the risk of decomposition due to contamination Danger of decomposition if exposed to heat When coming into contact with the product, impurities, decomposition catalysts, incompatible substances, combustible substances, may lead to self-accelerated, exothermic decomposition and the formation of oxygen Risk of over-pressure and burst due to decomposition in confined spaces and pipes Release of oxygen may support combustion Mixtures with organic materials (e.g. solvents) can display explosive properties
10.4 Conditions to avoid Sun rays, heat, heat effect
10.5 Incompatible materials Impurities, decomposition catalysts, metals, metallic salts, alkalis, hydrochloric acid, reducing agents, (risk of decomposition) Flammable substances (danger of fire) Organic solvents (danger of explosion)
10.6 Hazardous decomposition products Decomposition products under conditions of thermal decomposition: steam, oxygen
11. TOXICOLOGICAL INFORMATION
11.1 Information on toxicological effects
Acute Oral Toxicity: LD50 Rat (female): 801 mg/kg. Method: OECD Guide-line 401. Test Substance: Hydrogen peroxide , 50%
Acute Inhalation Toxicity: LC50 Rat (male/female) >0.17 mg/l/4h. Method: US-EPA-method. Test Substance: Hydrogen peroxide, 50% The maximum dose attainable under experimental conditions no fatalities.
Acute Dermal Toxicity LD50 Rabbit: >6500 mg/kg. Method: Literature. Test Substance: Hydrogen peroxide, 70% LD50 Rabbit (male/female): >2000 mg/kg. Method: US-EPA-method Test Substance: Hydrogen peroxide, 35%
Skin Corrosion/Irritation Rabbit/3 min. strongly corrosive. Method: Literature. Test Substance: Hydrogen peroxide, 70% Rabbit / 4h irritating. Test Substance: Hydrogen peroxide, 35%
Serious eye damage/eye irritation Rabbit. Risk of serious damage to eyes. Method: Literature. Test Substance: Hydrogen Peroxide, 35% Rabbit. Irritating. Method: OECD Guide-line 405. Test Substance: Hydrogen Peroxide, 10%, literature
Sensitisation Sensitization test guinea pig: not sensitising. Method: (Magnusson-Kligman test) Literature
Repeated Dose Toxicity Oral Mouse (female). / 90d, Subsequent observation period: 6 weeks. NOEL: 37 mg/kg. Target organ/effect: changes of parameters of blood, body weight development negative, irritative effect: Gastrointestinal tract. Method: OECD TG 408. Test substance : hydrogen peroxide 35%, Drinking water analysis Oral Mouse (male). : 90d, Subsequent observation period: 6 weeks. NOEL: 26 mg/kg. Target organ/effect: changes of parameters of blood, body weight development negative. Irritative effect: Gastrointestinal tract. Method: OECD TG 408. Test substance : hydrogen peroxide 35%Drinking water analysis
Assessment of STOT single exposure: No data available Assessment of STOT repeated exposure: No data available Risk of Aspiration Toxicity: No data available
Genotoxicity in vitro Bacterial reverse mutation assay S-typhimurium /E.coli positive and negative Metabolic activation; with or without -literature Chromosomal aberration mammalian cells positive. Metabolic activation: without. Method: OECD TG 473 literature Genetic mutation in mammal cells- positive. Metabolic activation: without, Method: OECD TG 476, literature
Genotoxicity in vivo Micronucleus test mouse intraperitoneal (i.p) negative. Method: OECD TG 474. Test substance: Hydrogen Peroxide 35%



<p>Carcinogenicity No data available Carcinogenicity assessment: Clues to possible carcinogenic effects in animal experiments: Up to date there is no evidence of increase tumour risk Hydrogen peroxide is not a carcinogenic substance according to MAK, IARC, NTP, OSHA, ACGIH</p>
<p>Toxicity to reproduction No data available</p>
<p>Human experience Effect on the skin: Causes caustic burns. With increasing contact length, local erythema or extreme irritation (whitening) up to blistering (caustic burn) can occur Effect on the eyes: Extreme irritation up to cauterisation. Can cause severe conjunctivitis, cornea damage or irreversible eye damage. Symptoms may occur with delay Effect when swallowed: Swallowing can lead to bleeding of the mucosa of the mouth, oesophagus and stomach. The rapid release of oxygen can cause distension and bleeding of the mucosa in the stomach and lead to severe damage of the internal organs, especially in the event of greater intake of the product Effect when inhaled: Inhalation of vapours/aerosols can lead to irritation of the respiratory tract and cause inflammation of the respiratory tract and pulmonary oedema. Symptoms may occur with delay</p>
<p>Toxicity Assessment Acute effects Harmful if swallowed. Causes skin irritation. Cause serious eye damage. May cause respiratory irritation. Due to the data available, the classification criteria for all further toxicological end points are not fulfilled</p>
<p>CMR Assessment Carcinogenicity: The classification criteria are not met based on the available data. Mutagenicity: The classification criteria are not met based on the available data.</p>
<p>12. ECOLOGICAL INFORMATION</p>
<p>Persistence and degradability Photo-decomposition: 50% degradation with approx.20 hours; medium: air Biodegradability: Result: Readily biodegradable. Semiquantitative measurement of concentration over time. Related to substance: Hydrogen Peroxide 100% Further information: Under ambient conditions quick hydrolysis, reduction or decomposition occurs. The following substances are formed: oxygen and water</p>
<p>Bio accumulative potential Bioaccumulation: none. Hydrogen peroxide quickly decomposes to oxygen and water</p>
<p>Ecotoxicity effects Toxicity to fish: LC50 semi-static test Primephales promelas: 16.4 mg/l/96h. Related to substance: hydrogen peroxide 100% Toxicity to daphnia: EC50 semi-static test Daphnia pulex: 2.4 mg/l/48h. Method: Literature. Related to substance: hydrogen peroxide 100% NOEC flow-through test Daphnia magna: 0.63 mg/l/21d. Method: Literature. Related to substance: hydrogen peroxide 100% Toxicity to algae: NOEC static test Skeletonema costatum: 0.63 mg/l/72h End point; growth rate. Related to substance: hydrogen peroxide 100% Toxicity to bacteria: EC50 Activated sludge: 466 mg/l/30min. Method: OECD TG 209. Related to substance: hydrogen peroxide 100% EC50 Activated sludge: 100mg/l/3h. Method: OECD TG 209. Related to substance: hydrogen peroxide 100%</p>
<p>12.5 Results of PBT and vPvB assessment Not a PBT, vPvB substance as per the criteria of the REACH Ordinance</p>
<p>Further information on ecology AOX: The product does not contain any organically bonded halogen Ecotoxicity Assessment Acute Aquatic toxicity: The classification criteria are not met based on the available data.</p>
<p>13. DISPOSAL CONSIDERATIONS</p>
<p>13.1 Waste treatment methods Product: Disposal in accordance to local authority regulations. If necessary: Because of recycling/disposal contact the relevant authorities. Offer surplus and non-recyclable solutions to a licensed disposal company With small amounts: May be disposed of as sewage water in accordance with local regulations by previously diluting with plenty of water. (Drainage systems, sewage treatment plant) Uncleaned Packaging: Rinse empty containers before disposal; recommended cleaning agent; water</p>



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Offer rinsed packaging material to local recycling facilities. Do not use empty containers and dispose of in accordance with the regulations issued by the appropriate local authorities. Dispose of containers that have not been emptied completely and/or cleaned like the substance

Waste Key Number

No waste key number as per the European Waste Types List can be assigned to this product, since such classification is based on the (as yet undetermined) use to which the product is put by the consumer. The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm/official authority

14. TRANSPORT INFORMATION

Land Transport ADR/RID/GGVSEB (Germany)

ADR/RID – Labels	
Class	5.1 (8)
UN No.	5.1
Packaging group	2014
Orange warning plate	II
Tunnel Restriction Code (ADR)	58/2014
Description of the goods (technical name)	(E) HYDROGEN PEROXIDE, AQUEOUS SOLUTION

Sea Transport IMDG-Code/GGVSee (Germany)

Class	
Subsidiary risk	5.1
UN No.	8
Packaging group	2014
EmS	II
Proper technical name (proper shipping name)	F-H, S-Q HYDROGEN PEROXIDE, AQUEOUS SOLUTION

Air Transport ICAO-TI/IATA-DGR

Class	
UN No.	5.1
Proper technical name (proper shipping name)	2014 Hydrogen peroxide, aqueous solution

Inland waterway transport ADN/ADNR/GGVSEB (Germany)

ADNR/RID labels	
Class	5.1 (8)
UN No. Substance number	5.1
Packaging group	2014
Description of the goods (technical name)	II HYDROGEN PEROXIDE, AQUEOUS SOLUTION

Loading instructions/Remarks

IATA-C	Transport prohibited
IATA-P	Transport prohibited
IMDG	Protect from heat. On deck only. Product-specific regulations on storing substances separately
IMDG	‘Separated from’ permanganates and class 4.1
TDG-INWTR	Canada: ERAQP 2-1008-072, ER 24 hour number 1 800 567 7455
TDG-RAIL	Canada: ERAQP 2-1008-072, ER 24 hour number 1 800 567 7455
TDG-ROAD	Canada: ERAQP 2-1008-072, ER 24 hour number 1 800 567 7455



15. REGULATORY INFORMATION

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

Registration

Europe (EINECS/ELINCS) – Listed/registered
USA(TSCA) – Listed/registered
Canada (DSL) – Listed/registered
Australia (AICS) – Listed/registered
Japan (MITI) – Listed/registered
Korea (TCCL) – Listed/registered
Philippines (PICCS) – Listed/registered
China – Listed/registered
Switzerland – Listed/registered

National legislation:

Regulations on labour safety:

It must be determined whether preventive substance-specific occupational medical examinations in accordance with national law in each case must be offered/carried out at regular intervals

Employment restriction:

Please note Directive 92/85/EEC (Pregnant Workers Directive) and amendments. Please note Directive 94/33/EC (Protection of Young Workers at the Workplace Directive) and amendments

Other regulations:

Please observe Appendix XVII of the EU Directive 1907/2006 (Restrictions on the manufacture, placing on the market, and use of certain dangerous substances, preparations and articles) as well as their amendments

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

Risk Phrase (R Phrase) texts

Hydrogen Peroxide

H302: Harmful if swallowed

H315: Causes skin irritation

H318: Causes serious eye damage.

H335: May cause respiratory irritation

Further information

Data for the product of the safety data sheet from the studies available and from the literature

Further information about the characteristics of the product can be found in the product code or practice or in the Product Brochure

Source of key data used to compile the data sheet

Supplier information

Modifications from last revision

The Specification has been updated. 50% has been reinstated. The Safety Data Sheet remains the same.

Date: 06/12/19

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SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****ANNEX**

Exposure scenario	ES1: Industrial use of hydrogen peroxide solutions in chemical synthesis or processes and formulation ES2: Loading and unloading operations, distribution covering all identified uses ES3: Bleaching with hydrogen peroxide solutions ES4: Environmental and agricultural use of hydrogen peroxide solutions ES5: Use of hydrogen peroxide solutions in cleaning agents ES6: Use of hydrogen peroxide solutions for hair bleaching and dyeing and tooth bleaching
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1. Short title of exposure scenario

ES1: Industrial use of hydrogen peroxide solutions in chemical synthesis or processes and formulation

2. Description of activities/process(es) covered in the Exposure Scenario

Sector of use	SU3	Industrial uses: Uses of substances as such or in preparations at industrial sites	
	SU4	Manufacture of food products	
	SU8	Manufacture of bulk, large scale chemicals (including petroleum products)	
	SU9	Manufacture of fine chemicals	
	SU10	Formulation [mixing] of preparations and/or re-packaging (excluding alloys)	
	SU11	Manufacture of rubber products	
	SU12	Manufacture of plastics products, including compounding and conversion	
	SU14	Manufacture of basic metals, including alloys	
	SU15	Manufacture of fabricated metal products, except machinery and equipment	
	SU16	Manufacture of computer, electronic and optical products, electrical equipment	
	SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment	
	Product category	PC0	Other (inorganic chemical, food additive)
		PC1	Adhesives, sealants
		PC2	Adsorbents
		PC8	Biocidal products (e.g. Disinfectants, pest control)
		PC9a	Coatings and paints, thinners, paint removers
		PC12	Fertilizers
PC14		Metal surface treatment products, including gal-vanic and electroplating products	
PC15		Non-metal-surface treatment products	
PC20		Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents	
PC21		Laboratory Chemicals	
PC23		Leather tanning, dye, finishing, impregnation and care products	
PC25	Metal working fluids		
PC26	Paper and board dye, finishing and impregnation products: including bleaches and other processing aids		
PC27	Plant Protection Products		
PC28	Perfumes, Fragrances		

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

	PC29	Pharmaceuticals
	PC31	Polishes and wax blends
	PC32	Polymer preparations and compounds
	PC33	Semiconductor
	PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids
	PC35	Washing and cleaning products (including solvent based products)
	PC37	Water treatment chemicals
	PC39	Cosmetics, personal care products
Process category	PROC1	Use in closed process, no likelihood of exposure
	PROC2	Use in closed, continuous process with occasional controlled exposure
	PROC3	Use in closed batch process (synthesis or formulation)
	PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
	PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
	PROC7	Industrial spraying
	PROC10	Roller application or brushing
	PROC12	Use of blowing agents in manufacture of foam
	PROC13	Treatment of articles by dipping and pouring
	PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
	PROC15	Use as laboratory reagent
	PROC21	Low energy manipulation of substances bound in materials and/or articles
Article category		not applicable
Cat. release to the environment	ERC1	Manufacture of substances
	ERC2	Formulation of preparations
	ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
	ERC6b	Industrial use of reactive processing aids
	ERC6c	Industrial use of monomers for manufacture of thermoplastics
	ERC6d	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

3. Application conditions**3.1 Duration and frequency****Operators and laboratory workers**

Short-term	8 hours/day
Long-term	220 days/year

Environment

Continuous exposure	360 days/year
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4.1 Physical form

liquid

4.2 Concentration of substance in preparation

Remarks	Application concentration up to: 70 %
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SAFETY DATA SHEET (EC 1907/2006)

Hydrogen Peroxide

4.3 Amount used per time or per activity

Value related to 100% active substance 20000 tonnes/year per site
Remarks Chemical synthesis

Remarks Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

Value related to 100% active substance 1010 tonnes/year per site
Remarks Chemical applications

Remarks Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

5. Other operational conditions

Compartment air
Emission or Release Factor 0.1 %
Remarks Chemical synthesis
Chemical applications

Water flow 0.11574 m³/s
Compartment sewage water
Emission or Release Factor 0.7 %
Remarks Chemical synthesis

Compartment Soil
Emission or Release Factor 0.01 %
Remarks Chemical synthesis

Water flow 0.02315 m³/s
Compartment sewage water
Emission or Release Factor 0.5 %
Remarks Chemical applications

Compartment Soil
Emission or Release Factor 0.1 %
Remarks Chemical applications

6. RISK MANAGEMENT MEASURES

6.1.1 Occupational Measures

Routes of exposure Oral, inhalation, dermal, also in combination
Organizational protective measures Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures Provide extract ventilation to points where emissions occur
Personal protective measures See Section 8 of the Safety Data Sheet.
Remarks

6.1.2 Consumer related measures

Not relevant for this exposure scenario.

SAFETY DATA SHEET (EC 1907/2006)**HYPROX® 700****6.2 Environment related measures**

Air	Passing of waste air through activated carbon filters
Water	one of the following techniques: Biological wastewater treatment Ozonation of wastewater Liquid phase carbon adsorption
Remarks	Effectiveness 97%

7. Waste related measures

Waste treatment	Treat as industrial waste
Prescribed disposal method	Waste should incinerated in thermal combustion units where hydrogen peroxide is completely removed.
Remarks	Seal and return containers

8. Prediction of exposure

Specific conditions	workers, oral
Remarks	Good industrial hygiene practice has to be followed and oral exposure is not relevant for workers.
Specific conditions	workers, dermal
Remarks	Workers handling concentrated hydrogen peroxide solutions containing 35% w/w or more are obliged to use appropriate dermal protection which is sufficient to avoid dermal exposure. Workers are obliged to wear effective safety glasses to avoid exposure of the eyes.
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC1
Value	<= 0.01 mg/m3
Remarks	Hydrogen peroxide 35% - 70%%
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC2
Value	<= 0.992 mg/m3
Remarks	Hydrogen peroxide 35% - 70%%
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC3
Value	<= 0.298 mg/m3
Remarks	Hydrogen peroxide 35% - 70%% Local exhaust ventilation 90% (LEV 90%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC4
Value	<= 0.496 mg/m3
Remarks	Hydrogen peroxide 35% - 70%% Local exhaust ventilation 90% (LEV 90%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC5
Value	<= 0.496 mg/m3
Remarks	Hydrogen peroxide 35% - 70%% Local exhaust ventilation 90% (LEV 90%)
Calculation method	ECETOC TRA

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Specific conditions workers, inhalation
value type PROC7
Value <= 0.425 mg/m3
Remarks Hydrogen peroxide 35% - 60%
Local exhaust ventilation 90% (LEV 90%)
Respiratory equipment 95% (PRE 95%)

Calculation method ECETOC TRA
Specific conditions workers, inhalation
value type PROC10
Value <= 0.85 mg/m3
Remarks Hydrogen peroxide 35% - 60%
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECETOC TRA
Specific conditions workers, inhalation
value type PROC12
Value <= 0.34 mg/m3
Remarks Hydrogen peroxide 50% - 60%
Local exhaust ventilation 80% (LEV 80%)

Calculation method ECETOC TRA
Specific conditions workers, inhalation
value type PROC13
Value <= 0.85 mg/m3
Remarks Hydrogen peroxide 35% - 60%
Local exhaust ventilation 90% (LEV 90%)
or
Respiratory equipment 90% (PRE 90%)

Calculation method ECETOC TRA
Specific conditions workers, inhalation
value type PROC14
Value <= 0.425 mg/m3
Remarks Hydrogen peroxide 35% - 60%
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECETOC TRA
Specific conditions workers, inhalation
value type PROC15
Value <= 0.496 mg/m3
Remarks Hydrogen peroxide 35% - 70%
Local exhaust ventilation 90% (LEV 90%)

Calculation method EUSES
Specific conditions environment
Chemical synthesis
value type Surface bodies of water
Value 0.00956 mg/l

Calculation method EUSES
Specific conditions environment
Chemical applications
value type Surface bodies of water
Value 0.00767 mg/l

Calculation method EUSES
Specific conditions environment
Chemical synthesis
value type marine water
Value 0.00088 mg/l

Calculation method EUSES
Specific conditions environment

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

value type	Chemical applications
Value	marine water
Calculation method	0.00069 mg/l
Specific conditions	EUSES
value type	environment
Value	Chemical synthesis
Calculation method	Soil
Specific conditions	0.000201 mg/l
value type	EUSES
Value	environment
Calculation method	Chemical applications
Specific conditions	Soil
value type	0.000121 mg/l
Value	EUSES
Calculation method	environment
Specific conditions	Chemical synthesis
value type	sewage treatment plant
Value	0.272 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	Chemical applications
Value	sewage treatment plant
Calculation method	0.0491 mg/l
Specific conditions	

9. Guidance to downstream user

If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
Confer with the producer.

1. Short title of exposure scenario

ES2: Loading and unloading operations, distribution covering all identified uses

2. Description of activities/process(es) covered in the Exposure Scenario

Sector of use	SU3	Industrial uses: Uses of substances as such or in preparations at industrial sites
	SU4	Manufacture of food products
	SU5	Manufacture of textiles, leather, fur
	SU6a	Manufacture of wood and wood products
	SU6b	Manufacture of pulp, paper and paper products
	SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
	SU9	Manufacture of fine chemicals
	SU10	Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
	SU11	Manufacture of rubber products
	SU12	Manufacture of plastics products, including compounding and conversion
	SU14	Manufacture of basic metals, including alloys
	SU15	Manufacture of fabricated metal products, except machinery and equipment
	SU16	Manufacture of computer, electronic and optical products, electrical equipment

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

	SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
	SU21	Consumer uses: Private households (= general public = consumers)
	SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Product category	PC1	Adhesives, sealants
	PC8	Biocidal products (e.g. Disinfectants, pest control)
	PC12	Fertilizers
	PC14	Metal surface treatment products, including gal-vanic and electroplating products
	PC15	Non-metal-surface treatment products
	PC21	Laboratory Chemicals
	PC25	Metal working fluids
	PC27	Plant Protection Products
	PC29	Pharmaceuticals
	PC31	Polishes and wax blends
	PC32	Polymer preparations and compounds
	PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids
	PC35	Washing and cleaning products (including solvent based products)
	PC37	Water treatment chemicals
Process category	PC39	Cosmetics, personal care products
	PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
	PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Article category	PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
		not applicable
Cat. release to the environment	ERC1	Manufacture of substances
	ERC2	Formulation of preparations
	ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
	ERC6b	Industrial use of reactive processing aids
	ERC6c	Industrial use of monomers for manufacture of thermoplastics

3. Application conditions**3.1 Duration and frequency****Operator**

Short-term

8 hours/day

Long-term

220 days/year

4.1 Physical form**liquid****4.2 Concentration of substance in preparation**

Remarks

Application concentration up to:
99 %

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****4.3 Amount used per time or per activity****5. Other operational conditions**

Remarks	No relevant environmental emissions are anticipated with the transfer of the substance (EU Risk Assessment Report, European Commission 2003).
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6. RISK MANAGEMENT MEASURES**6.1.1 Occupational Measures**

Routes of exposure	inhalation, dermal, also in combination
Organizational protective measures	Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures	Provide extract ventilation to points where emissions occur
Personal protective measures	See Section 8 of the Safety Data Sheet.
Remarks	

6.1.2 Consumer related measures

Not relevant for this exposure scenario.

6.2 Environment related measures

Air	Generally closed systems
Water	No waste water occurs. If leak, wash away with plenty of water and send to industrial wastewater treatment system.
Remarks	No relevant environmental emissions are anticipated with the transfer of the substance.

7. Waste related measures

Waste treatment	Treat as industrial waste
Remarks	Normally no waste generation. Seal and return containers

8. Prediction of exposure

Specific conditions	workers, oral
Remarks	Good industrial hygiene practice has to be followed and oral exposure is not relevant for workers.
Specific conditions	workers, dermal
Remarks	Workers handling concentrated hydrogen peroxide solutions containing 35% w/w or more are obliged to use appropriate dermal protection which is sufficient to avoid dermal exposure. Workers are obliged to wear effective safety glasses to avoid exposure of the eyes.
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC8a
Value	1.42 mg/m ³
Remarks	hydrogen peroxide, 99% Local exhaust ventilation 90% (LEV 90%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC8b
Value	0.21 mg/m ³
Remarks	hydrogen peroxide, 99% Local exhaust ventilation 97% (LEV 97%)

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC9
Value	0.71 mg/m ³
Remarks	hydrogen peroxide, 99% Local exhaust ventilation 90% (LEV 90%)

9. Guidance to downstream user

If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
Confer with the producer.

1. Short title of exposure scenario

ES3: Bleaching with hydrogen peroxide solutions

2. Description of activities/process(es) covered in the Exposure Scenario

Sector of use	SU3	Industrial uses: Uses of substances as such or in preparations at industrial sites
	SU5	Manufacture of textiles, leather, fur
	SU6a	Manufacture of wood and wood products
	SU6b	Manufacture of pulp, paper and paper products
	SU21	Consumer uses: Private households (= general public = consumers)
Product category	SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
	PC23	Leather tanning, dye, finishing, impregnation and care products
	PC24	Lubricants, greases, release products
	PC26	Paper and board dye, finishing and impregnation products: including bleaches and other processing aids
Process category	PC34	Textile dyes, finishing and impregnating products; including bleaches and other processing aids
	PROC1	Use in closed process, no likelihood of exposure
	PROC2	Use in closed, continuous process with occasional controlled exposure
	PROC3	Use in closed batch process (synthesis or formulation)
	PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
Article category	PROC13	Treatment of articles by dipping and pouring
	PROC19	Hand-mixing with intimate contact and only PPE available not applicable
Cat release to the environment	ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
	ERC6b	Industrial use of reactive processing aids
	ERC8a	Wide dispersive indoor use of processing aids in open systems
	ERC8b	Wide dispersive indoor use of reactive substances in open systems
	ERC8e	Wide dispersive outdoor use of reactive substances in open systems

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****3. Application conditions****3.1 Duration and frequency****Operator**

Short-term 8 hours/day
Long-term 220 days/year

Consumers

Short-term 10 minutes / event
Long-term 3 - 4 events / week

Environment

Continuous exposure 360 days/year
Pulp bleaching, de-inking
Continuous exposure 360 days/year
Other bleaching

4.1 Physical form

liquid

4.2 Concentration of substance in preparation

Remarks Application concentration up to:
35 %

4.3 Amount used per time or per activity

Value related to 100% active substance 9810 tonnes/year per site
Remarks Pulp bleaching, de-inking

Remarks Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

Value related to 100% active substance 1010 tonnes/year per site
Remarks Other bleaching

Remarks Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

5. Other operational conditions

Compartment air
Emission or Release Factor 0.1 %
Remarks Pulp bleaching, de-inking

Compartment air
Emission or Release Factor 1 %
Remarks Other bleaching

Water flow 0.20254 m³/s
Compartment sewage water
Emission or Release Factor 0.9 %
Remarks Pulp bleaching, de-inking

Water flow 0.02315 m³/s

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Compartment	sewage water
Emission or Release Factor	0.9 %
Remarks	Other bleaching

Compartment	Soil
Emission or Release Factor	0.01 %
Remarks	Pulp bleaching, de-inking Other bleaching

6. RISK MANAGEMENT MEASURES**6.1.1 Occupational Measures**

Routes of exposure	inhalation, dermal, also in combination
Organizational protective measures	Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures	Provide extract ventilation to points where emissions occur
Personal protective measures	See Section 8 of the Safety Data Sheet.
Remarks	

6.1.2 Consumer related measures

Not relevant for this exposure scenario.

6.2 Environment related measures

Air	Passing of waste air through activated carbon filters
Water	one of the following techniques: Biological wastewater treatment Ozonation of wastewater
Remarks	Effectiveness 99,30% Wastewater from professional and private bleaching should be sent to the public sewerage system, where rapid decomposition of hydrogen peroxide in contact with sewage will occur.

7. Waste related measures

Waste treatment	Treat as industrial waste
Remarks	Industrial solid and liquid waste Seal and return containers
Waste treatment	Disposal practice as with household wastes
Remarks	Professional, private solid and liquid waste

8. Prediction of exposure

Specific conditions	workers, oral
Remarks	Good industrial hygiene practice has to be followed and oral exposure is not relevant for workers.
Specific conditions	workers, dermal
Remarks	Workers handling concentrated hydrogen peroxide solutions containing 35% w/w or more are obliged to use appropriate dermal protection which is sufficient to avoid dermal exposure. Workers are obliged to wear effective safety glasses to avoid exposure of the eyes.
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation Industrial user
value type	PROC1
Value	0.005 mg/m ³
Remarks	hydrogen peroxide, 35 %

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
Industrial user
value type PROC2
Value 0.05 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
Industrial user
value type PROC3
Value 0.149 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
Industrial user
value type PROC4
Value 0.248 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
Industrial user
value type PROC13
Value 0.496 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
professional user
value type PROC1
Value 0.005 mg/m³
Remarks hydrogen peroxide, 35 %

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
professional user
value type PROC2
Value 0.496 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 80% (LEV 80%)

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
professional user
value type PROC3
Value 0.298 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 80% (LEV 80%)

Calculation method ECE TOC TRA
Specific conditions workers, inhalation
professional user
value type PROC4
Value 0.992 mg/m³
Remarks hydrogen peroxide, 35 %
Local exhaust ventilation 80% (LEV 80%)

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Calculation method	ECETOC TRA
Specific conditions	workers, inhalation professional user
value type	PROC13
Value	0.34 mg/m ³
Remarks	hydrogen peroxide, 12 % Local exhaust ventilation 80% (LEV 80%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation professional user
value type	PROC19
Value	0.85 mg/m ³
Remarks	hydrogen peroxide, 12 % Local exhaust ventilation 80% (LEV 80%)
Specific conditions	Consumers - oral
Remarks	Under normal conditions of use oral exposure can be neglected.
Specific conditions	Consumers - dermal
Remarks	Consumers normally do not come into contact with products containing more than 12% w/w of the substance. Some products are on the market that contain more than 12% w/w hydrogen peroxide. It is recommended that consumers use gloves and safety glasses when handling pure or barely diluted products.
Specific conditions	Consumers - inhalation
Value	13 mg/m ³
Remarks	(Based on EU Risk Assessment Report, European Commission 2003)
Calculation method	EUSES
Specific conditions	environment Pulp bleaching, de-inking
value type	Surface bodies of water
Value	0.0126 mg/l
Calculation method	EUSES
Specific conditions	environment Pulp bleaching, de-inking
value type	marine water
Value	0.00118 mg/l
Calculation method	EUSES
Specific conditions	environment Pulp bleaching, de-inking
value type	Soil
Value	0.000158 mg/kg
Calculation method	EUSES
Specific conditions	environment Pulp bleaching, de-inking
value type	sewage treatment plant
Value	0.0981 mg/l
Calculation method	EUSES
Specific conditions	environment Other bleaching
value type	Surface bodies of water
Value	0.0116 mg/l
Calculation method	EUSES
Specific conditions	environment Other bleaching

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

value type	marine water
Value	0.00108 mg/l
Calculation method	EUSES
Specific conditions	environment Other bleaching
value type	Soil
Value	0.000159 mg/kg
Calculation method	EUSES
Specific conditions	environment Other bleaching
value type	sewage treatment plant
Value	0.0884 mg/l

9. Guidance to downstream user

If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
Confer with the producer.

1. Short title of exposure scenario

ES4: Environmental and agricultural use of hydrogen peroxide solutions

2. Description of activities/process(es) covered in the Exposure Scenario

Sector of use	SU1	Agriculture, forestry, fishery
	SU2a	Mining, (without offshore industries)
	SU2b	Offshore industries
	SU3	Industrial uses: Uses of substances as such or in preparations at industrial sites
	SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
	SU21	Consumer uses: Private households (= general public = consumers)
	SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
	Product category	PC0
PC20		Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents
PC37		Water treatment chemicals
Process category	PROC1	Use in closed process, no likelihood of exposure
	PROC2	Use in closed, continuous process with occasional controlled exposure
	PROC3	Use in closed batch process (synthesis or formulation)
	PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
Article category		not applicable
Cat. release to the environment	ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
	ERC6b	Industrial use of reactive processing aids
	ERC8a	Wide dispersive indoor use of processing aids in open systems
	ERC8b	Wide dispersive indoor use of reactive substances in open systems
	ERC8d	Wide dispersive outdoor use of processing aids in open

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

ERC8e systems
Wide dispersive outdoor use of reactive substances in open systems

3. Application conditions**3.1 Duration and frequency****Worker**

Short-term 8 hours/day
Long-term 220 days/year

Consumers

Short-term 45 Seconds/Application

Environment

Continuous exposure 360 days/year

4.1 Physical form

liquid

4.2 Concentration of substance in preparation

Remarks Worker
Application concentration up to:
50 %
Consumers
Application concentration up to:
12 %

4.3 Amount used per time or per activity

Value related to 100% active substance 185 tonnes/year per site

Remarks Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

5. Other operational conditions

Compartment air
Emission or Release Factor 10 %

Water flow 0.02315 m³/s
Compartment sewage water
Emission or Release Factor 5 %

Compartment Soil
Emission or Release Factor 8 %

6. RISK MANAGEMENT MEASURES**6.1.1 Occupational Measures**

Routes of exposure Oral, inhalation, dermal, also in combination
Organizational protective measures Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures Provide extract ventilation to points where emissions occur
Personal protective measures See Section 8 of the Safety Data Sheet.
Remarks

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****6.1.2 Consumer related measures**

Not relevant for this exposure scenario.

6.2 Environment related measures

Remarks Fast decomposition of hydrogen peroxide is anticipated with environmental and agricultural uses of hydrogen peroxide due to its high reactivity.

7. Waste related measures

Remarks No specific waste treatment required/proposed.

8. Prediction of exposure

Specific conditions workers, oral
Remarks Good industrial hygiene practice has to be followed and oral exposure is not relevant for workers.

Specific conditions workers, dermal
Remarks Workers handling concentrated hydrogen peroxide solutions containing 35% w/w or more are obliged to use appropriate dermal protection which is sufficient to avoid dermal exposure.
Workers are obliged to wear effective safety glasses to avoid exposure of the eyes.

Calculation method ECETOC TRA
Specific conditions workers, inhalation
Industrial user
professional user
Indoor
value type PROC1
Value ≤ 0.007 mg/m³
Remarks Hydrogen peroxide 35% - 50%

Calculation method ECETOC TRA
Specific conditions workers, inhalation
Industrial user
Indoor
value type PROC2
Value ≤ 0.708 mg/m³
Remarks Hydrogen peroxide 35% - 50%

Calculation method ECETOC TRA
Specific conditions workers, inhalation
Industrial user
Indoor
value type PROC3
Value ≤ 0.213 mg/m³
Remarks Hydrogen peroxide 35% - 50%
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECETOC TRA
Specific conditions workers, inhalation
Industrial user
Indoor
value type PROC4
Value ≤ 0.354 mg/m³
Remarks Hydrogen peroxide 35% - 50%
Local exhaust ventilation 90% (LEV 90%)

Calculation method ECETOC TRA

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Specific conditions	workers, inhalation professional user Indoor
value type	PROC2
Value	$\leq 0.708 \text{ mg/m}^3$
Remarks	Hydrogen peroxide 35% - 50% Local exhaust ventilation 80% (LEV 80%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation professional user Indoor
value type	PROC3
Value	$\leq 0.425 \text{ mg/m}^3$
Remarks	Hydrogen peroxide 35% - 50% Local exhaust ventilation 80% (LEV 80%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation professional user Indoor
value type	PROC4
Value	$\leq 1.06 \text{ mg/m}^3$
Remarks	Hydrogen peroxide 35% - 50% Local exhaust ventilation 85% (LEV 85%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC4
Value	$\leq 0.34 \text{ mg/m}^3$
Remarks	hydrogen peroxide, 12% Local exhaust ventilation 80% (LEV 80%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation Industrial user professional user Outdoor
value type	PROC1
Value	$\leq 0.007 \text{ mg/m}^3$
Remarks	Hydrogen peroxide 35% - 50%
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation Industrial user Outdoor
value type	PROC2
Value	$\leq 0.496 \text{ mg/m}^3$
Remarks	Hydrogen peroxide 35% - 50%
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation Industrial user professional user Outdoor
value type	PROC3
Value	$\geq 0.149 \text{ mg/m}^3$
Remarks	Hydrogen peroxide 35% - 50% Respiratory equipment 90% (PRE 90%)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation Industrial user

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

value type	Outdoor
Value	PROC4
Remarks	<= 0.248 mg/m3
Calculation method	Hydrogen peroxide 35% - 50%
Specific conditions	ECE TOC TRA
	workers, inhalation
	professional user
	Outdoor
value type	PROC2
Value	<= 0.248 mg/m3
Remarks	Hydrogen peroxide 35% - 50%
	Respiratory equipment 90% (PRE 90%)
Calculation method	ECE TOC TRA
Specific conditions	workers, inhalation
	professional user
	Outdoor
value type	PROC4
Value	<= 0.496 mg/m3
Remarks	Hydrogen peroxide 35% - 50%
	Respiratory equipment 90% (PRE 90%)
Calculation method	EUSES
Specific conditions	environment
value type	Surface bodies of water
Value	0.0118 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	marine water
Value	0.0011 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	Soil
Value	0.000195 mg/kg
Calculation method	EUSES
Specific conditions	environment
value type	sewage treatment plant
Value	0.0901 mg/l

9. Guidance to downstream user

If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
Confer with the producer.

1. Short title of exposure scenario

ES5: Use of hydrogen peroxide solutions in cleaning agents

2. Description of activities/process(es) covered in the Exposure Scenario

Sector of use	SU4	Manufacture of food products
	SU20	Health services
	SU21	Consumer uses: Private households (= general public = consumers)
	SU22	Professional uses: Public domain (administration,

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

Product category	PC21 PC35	education, entertainment, services, craftsmen Laboratory Chemicals Washing and cleaning products (including solvent based products)
Process category	PROC4 PROC10 PROC11 PROC13 PROC19	Use in batch and other process (synthesis) where opportunity for exposure arises Roller application or brushing Non industrial spraying Treatment of articles by dipping and pouring Hand-mixing with intimate contact and only PPE available not applicable
Article category		
Cat. release to the environment	ERC8a ERC8b ERC8d ERC8e	Wide dispersive indoor use of processing aids in open systems Wide dispersive indoor use of reactive substances in open systems Wide dispersive outdoor use of processing aids in open systems Wide dispersive outdoor use of reactive substances in open systems

3. Application conditions**3.1 Duration and frequency****Worker**

Short-term	8 hours/day
Long-term	220 days/year

Consumers

Short-term	20 minutes / event
Long-term	1 event / day

Environment

Continuous exposure	365 days/year
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4.1 Physical form

liquid

4.2 Concentration of substance in preparation

Remarks	Application concentration up to: 12 %
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4.3 Amount used per time or per activity

Value	related to 100% active substance 6210 tonnes/year
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Remarks	Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario. If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
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Value	related to 100% active substance <= 400 g / per activity
Remarks	professional user

Remarks	Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario. If necessary, an increase in the use tonnage can be achieved by
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SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide**

adapting the use conditions to local circumstances (scaling).

Value related to 100% active substance <= 110 g / per activity
Remarks Consumers

Remarks Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

5. Other operational conditions

Compartment	air
Emission or Release Factor	0 %
Water flow	0.02315 m ³ /s
Compartment	sewage water
Emission or Release Factor	80 %
Compartment	Soil
Emission or Release Factor	0 %

6. RISK MANAGEMENT MEASURES**6.1.1 Occupational Measures**

Technical protective measures	Good general ventilation should be provided.
Personal protective measures	See Section 8 of the Safety Data Sheet.
Remarks	.

6.1.2 Consumer related measures

Consumer Measures	Wear personal protective equipment. Wash hands thoroughly after handling.
Remarks	See Section 8 of the Safety Data Sheet.

6.2 Environment related measures

Air	No relevant emissions
Water	Biological wastewater treatment
Remarks	Effectiveness 99,30% Wastewater from professional and private bleaching should be sent to the public sewerage system, where rapid decomposition of hydrogen peroxide in contact with sewage will occur.

7. Waste related measures

Waste treatment	Disposal practice as with household wastes
Remarks	Professional, private solid and liquid waste

8. Prediction of exposure

Specific conditions	workers, oral
Remarks	Good industrial hygiene practice has to be followed and oral exposure is not relevant for workers.

Specific conditions	workers, dermal
Remarks	Dermal exposure to cleaners containing 12% w/w hydrogen peroxide is possible. The use of gloves (PVC, rubber) is recommended. The use of safety glasses is required when pure cleaners are handled.

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Calculation method	ConsExpo
Specific conditions	workers, inhalation
Value	Consumers - inhalation 0.002 mg/m ³
Remarks	Spray cleaning hydrogen peroxide, 7% Acceptance AISE 2009
Calculation method	ConsExpo
Specific conditions	workers, inhalation
Value	Consumers - inhalation 1.07 mg/m ³
Remarks	Cleaning by wiping, brushing hydrogen peroxide, 7% Acceptance AISE 2009
Calculation method	ConsExpo
Specific conditions	workers, inhalation
Value	Consumers - inhalation 1.16 mg/m ³
Remarks	Using toilet cleaner hydrogen peroxide, 12% Acceptance AISE 2009
Calculation method	ConsExpo
Specific conditions	workers, inhalation
Value	1.07 mg/m ³
Remarks	Using cleaner containing hydrogen peroxide Reasonable worst case long-term exposure hydrogen peroxide, 7% Acceptance AISE 2009
Specific conditions	Consumers - oral
Remarks	Under normal conditions of use oral exposure can be neglected.
Specific conditions	Consumers - dermal
Remarks	Dermal exposure to cleaners containing 12% w/w hydrogen peroxide is possible. It is recommended that consumers use gloves and safety glasses when handling pure or barely diluted products.
Calculation method	EUSES
Specific conditions	environment
value type	Surface bodies of water
Value	0.0037 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	marine water
Value	0.000294 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	Soil
Value	0.000111 mg/kg
Calculation method	EUSES
Specific conditions	environment
value type	sewage treatment plant
Value	0.0095 mg/l

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****9. Guidance to downstream user**

If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
Confer with the producer.

1. Short title of exposure scenario

ES6: Use of hydrogen peroxide solutions for hair bleaching and dyeing and tooth bleaching

2. Description of activities/process(es) covered in the Exposure Scenario

Sector of use	SU21	Consumer uses: Private households (= general public = consumers)
	SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Product category	PC39	Cosmetics, personal care products
Process category	PROC19	Hand-mixing with intimate contact and only PPE available not applicable
Article category		
Cat. release to the environment	ERC8b	Wide dispersive indoor use of reactive substances in open systems

3. Application conditions**3.1 Duration and frequency****Worker**

Remarks(Long-term)

The assessment of human health risks due to the use of cosmetics and personal care products does not fall under the REACH Regulation (EC) No 1907/2006.

Environment

Continuous exposure

365 days/year

4.1 Physical form

liquid

4.2 Concentration of substance in preparation

Remarks

Application concentration up to:
12 %

4.3 Amount used per time or per activity

Value

Remarks

related to 100% active substance 6210 tonnes/year
small amounts
professional user
Consumers

Remarks

Tonnages are given by way of example and ensure a safe use under the use conditions listed in this scenario.
If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****5. Other operational conditions**

Compartment	air
Emission or Release Factor	0 %
Water flow	0.02315 m3/s
Compartment	sewage water
Emission or Release Factor	80 %
Compartment	Soil
Emission or Release Factor	0 %

6. RISK MANAGEMENT MEASURES**6.1.1 Occupational Measures**

Technical protective measures	Good general ventilation should be provided.
Personal protective measures	See Section 8 of the Safety Data Sheet.
Remarks	

6.1.2 Consumer related measures**Hand-mixing with intimate contact and only PPE available**

Consumer Measures	Wear personal protective equipment. Keep out of reach of children.
Remarks	See Section 8 of the Safety Data Sheet.

6.2 Environment related measures

Air	No relevant emissions
Water	Biological wastewater treatment
Remarks	Effectiveness 97% Wastewater from professional and private bleaching should be sent to the public sewerage system, where rapid decomposition of hydrogen peroxide in contact with sewage will occur.

7. Waste related measures

Waste treatment	Disposal practice as with household wastes
Remarks	Professional, private solid and liquid waste

8. Prediction of exposure

Calculation method	EUSES
Specific conditions	environment
value type	Surface bodies of water
Value	0.00466 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	marine water
Value	0.00039 mg/l
Calculation method	EUSES
Specific conditions	environment
value type	Soil
Value	0.00011 mg/kg
Calculation method	EUSES
Specific conditions	environment
value type	sewage treatment plant
Value	0.019 mg/l

SAFETY DATA SHEET (EC 1907/2006)**Hydrogen Peroxide****9. Guidance to downstream user**

If necessary, an increase in the use tonnage can be achieved by adapting the use conditions to local circumstances (scaling).
Confer with the producer.



SAFETY DATA SHEET

Version 4 – 04/01/2022

EMERGENCY TELEPHONE NUMBERS

01278 780427 – OFFICE HOURS

1. IDENTIFICATION: Sodium Chloride
2. PRODUCT DESCRIPTION

Alternative Names

Salt (Various Grades)

Brine

Common Salt

Granular

Pure Dried Vacuum Salt (PDV)

Undried Vacuum Salt (UV)

CAS No: 007647-14-15

Form: Crystalline Solid

Colour: Colourless

Odour: Odourless

3. SUMMARY

Unlikely to cause harmful effects under normal conditions of handling and use.

Occupational Exposure Limits

UK EH40: OES as total dust. 10mg/m³ (8hr TWA)
As respirable dust. 5mg/m³ (8hr TWA)

4. PHYSICO CHEMICAL DATA

Boiling Point (Deg C): 1413

Melting Point (Deg C): 802

Density (g/ml): 2165 at 20 Deg C

Vapour Pressure (mm Hg): 2.4 at 747 Deg C

Solubility (Water): readily soluble

5. STABILITY/REACTIVITY

Hazardous Reactions Reaction with concentrated acid will produce hydrogen chloride.

Under wet conditions, will corrode many common metals, particularly iron, aluminium and zinc.

6. STORAGE

Keep container dry. Keep away from concentrated acids. Keep away from valued vegetation.

TECHNICAL DATA SHEET

7. HANDLING

Avoid prolonged skin contact. Avoid inhalation of high concentrations of dust. Keep away from concentrated acids and common metals. Static electricity can be generated by pneumatic conveying, therefore pipes should be bonded and earthed, especially where a spark could prove hazardous.

8. PERSONAL PROTECTION

Wear suitable protective clothing.

9. SPILLAGE/ACCIDENTAL RELEASE

Clear up spillages. Transfer to a container for disposal. Alternatively, drench spillage with water and wash to drain.

10. WASTE DISPOSAL

Disposal should be in accordance with local, state or national legislation.

11. FIRST AID MEASURES

Inhalation: Unlikely to be required but if necessary treat symptomatically.

Skin Contact: Wash skin with water

Eye Contact: Irrigate with eyewash solution or clean water, holding eyelids apart for at least 10 minutes, If symptoms develop, seek medical attention.

Ingestion: Vomiting is likely. Wash out mouth with water and give 200-300ml (half a pint) of water to drink. Obtain medical attention especially if vomiting has not occurred.

Further Medical Treatment

Unlikely to be required but if necessary, treat symptomatically.

12. FIRE AND EXPLOSION

Non-flammable. Will stand temperatures up to its melting point and beyond without decomposing.

13. HEALTH HAZARD: TOXICITY DATA

Inhalation: High concentrations of dust may be irritant to the respiratory tract.

Skin contact: Dry Salt and concentrated solutions will remove the natural greases from the skin resulting in dryness. Repeated and/or prolonged contact may cause irritation.

Eye contact: High concentrations may cause irritation

Ingestion: The swallowing of small amounts is unlikely to cause any adverse effects. Excessive doses may result in irritation of the gastrointestinal tract leading to nausea, vomiting and diarrhoea.

Long Term Exposure:

Chronic effects may result from the ingestion of excessive amounts of either salt or brine.

Ingestion of hypertonic solutions can cause disturbance of body electrolyte and fluid balance.

14. ENVIRONMENTAL INFORMATION

96hour	LC50	(Fish)	6750 mg/l
48hour	EC50	(Daphnia)	2024 mg/l
72hour	IC50	(Algae)	3014 mg/l
Daphnia Subacute			1062 mg/l
Fish Subacute			433 mg/l
Log POW			0
BOD 5 day			0
COD			0
Biodegradation			0
Levels of Degradation			
Organic Carbon			0
Oxygen Depletion			0
Carbon Dioxide Generation			0
Sediment			
Sorbtion			0
Desorbtion			0
Aerobic Soil Biodegradation			0
Earthworm Toxicity			100/ug/cm ²
Photodegradability			Infinite OH
Abiotic Degradability			
Photolysis			0
Hydrolysis			0
Oxidation			0

15. REGULATORY INFORMATION

User

Not Classified as Hazardous to Users

EEC Classification:

Under the Classification, Packaging and Labelling of Dangerous Substances Reg. 1984, this material is not dangerous for supply or conveyance.

Transport

Not Classified as Hazardous for Transport



Anderson Water Equipment Limited
Cardiff Bay Business Centre
Ocean Park
Cardiff
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sales@aweltd.co.uk

TECHNICAL DATA SHEET



SALT EXPRESS LTD
DOCUMENT REF: PDV/MM/FG
ISSUE: 2
REVIEW DATE: AUGUST 23

PURE DRIED VACUUM(PDV) SALT SPECIFICATIONS

Purity	%m/m NaCl	99.7 - 99.9
Appearance	White colourless thin crystals	
Humidity	% m/m	0.01-0.03
Acidity 0.01M/Naoh		<0.5ml
Alkalinity 0.01 M/Hcl		<0.5ml
Sulphate	ppm	<200
Arsenic	ppm	<1
Iron	ppm	<2
Magnesium and alkaline-earthmetals	ppm	<100
Aluminium	ppm	<0.2
Phosphates	ppm	<25
Insolubility in water	%m/m	<0.5
Insolubility in acid	%m/m	<0.5
Sulphate	mgSO4/kg	<10
Bacterial Endotoxin		Negative
pH	5.5 +/- 1.0	
Grain size	<210 micron%	0-20
	<1000 micron%	100
	210-1000 micron%	80-98
Shelf life	4 years after production date	
Storing	Should be kept in dry and dark place, packed, and sealed.	
Anticaking Agent	E536	
Iodine	Upon request	

Country of Origin – Turkey

Compliant with TSE/BS EN 973:2009, chemicals used for treatment of water intended for human consumption – Sodium Chloride for regeneration of ion exchangers.

Compliant with BS EN14805:2008, chemicals used for treatment of water intended for human consumption - Sodium Chloride used for onsite electro chlorination using non-membrane technology.

*Food Grade . FSSC:22000 certified

Important Note: The information contained in this document is given in good faith and is to the best of Salt Express Ltd' knowledge correct at the date of publication, but it is for the users to satisfy themselves of the suitability of the product for their purposes.

Date:	Delivery note no:
Order No:	To:
Print Name: K Bennie	Signature: <i>KRBennie</i>