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Product name	Danafloat™ 233	Revision: September 2020
Safety data sheet according to EU Reg. 1907/2006 as amended		Supersedes August 2018

SAFETY DATA SHEET

Danafloat™ 233

Revision: Sections containing a revision or new information are marked with a ♣.

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

- 1.1. **Product identifier** **Danafloat™ 233**
Contains sodium hydroxide and sodium O,O-diisopropyl dithiophosphate
- 1.2. **Relevant identified uses of the substance or mixture and uses advised against** Can be used as flotation reagent (flotation collector) only.
- 1.3. **Details of the supplier of the safety data sheet** **FMC Agricultural Solutions A/S**
 Thyborønvej 78
 DK-7673 Harbøre
 Denmark
SDS.Ronland@fmc.com
- 1.4. **Emergency telephone number**
Medical emergencies:
- | | |
|-------------------------------------|---|
| Austria: +43 1 406 43 43 | Malta: 112 |
| Belgium: +32 70 245 245 | Netherlands: +31 30 274 88 88 |
| Bulgaria: +359 2 9154 409 | Norway: +47 22 591300 |
| Cyprus: 1401 | Poland: +48 22 619 66 54 |
| Czech Republic: +420 224 919 293 | +48 22 619 08 97 |
| +420 224 915 402 | Portugal: 800 250 250 (in Portugal only) |
| Denmark: +45 82 12 12 12 | +351 21 330 3284 |
| England and Wales: 111 | Romania: +40 21318 3606 |
| Estonia: +372 7943500 | Scotland: +8454 24 24 24 |
| Finland: +358 9 471 977 | Slovakia: +421 2 54 77 4 166 |
| France: +33 (0) 1 45 42 59 59 | Slovenia: +386 41 650 500 |
| Greece: 30 210 77 93 777 | South Africa: +27 83 123 3911 (Bateleur Emergency Response Co.) |
| Hungary: +36 80 20 11 99 | Spain: +34 91 562 04 20 |
| Ireland (Republic): +353 1 837 9964 | Sweden: +46 08-331231 |
| Italy: +39 02 6610 1029 | 112 |
| Latvia: +371 670 42 473 | Switzerland: 145 |
| 112 | Turkey: 114 |
| Lithuania: +370 523 62052 | U.S.A. & Canada: +1 800 / 331 3148 |
| +370 687 53378 | All other countries: +1 651 / 632 6793 (Collect) |
| Luxembourg: +352 8002 5500 | |

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For fire, leak, spill or other accident emergencies:

U.S.A.: +1 800 / 424 9300 (CHEMTREC)
 All other countries: +1 703 / 741 5970 (CHEMTREC - Collect)

♣ SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Skin corrosion: Category 1C (H314)
 Eye damage: Category 1 (H318)

Health hazards The product can have severe irritating effects on skin, eyes, upper digestive tract and respiratory tract.

Environmental hazards The product is not expected to be very dangerous in the aquatic environment.

2.2. Label elements

According to EU Reg. 1272/2008 as amended

Product identifier Danafloat™ 233
 Contains sodium hydroxide and sodium O,O-diisopropyl dithio-phosphate

Hazard pictogram (GHS05)



Signal word Danger

Hazard statement

H314 Causes severe skin burns and eye damage.

Precautionary statements

P280 Wear protective gloves, protective clothing and eye protection or face protection.

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 or 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 physician.

P501 Dispose of contents and container as hazardous waste.

2.3. Other hazards None of the ingredients in the product meets the criteria for being PBT or vPvB.

♣ SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances The product is a mixture, not a substance

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3.2. **Mixtures** See section 16 for full text of hazard statements.

Active ingredient

i-Propyl-dtp-Na	Content: 48 - 52% by weight
CAS name	Phosphorodithioic acid, O,O-bis(1-methylethyl) ester, sodium salt
CAS no.	27205-99-8
IUPAC name	Sodium O,O-diisopropyl phosphorodithioate
EU name	Sodium-O,O-diisopropyl dithiophosphate
Other name(s)	i-Propyl-dtp-Na
EC no. (EINECS no.)	248-322-2
EU index no.	None
Registration no.	01-2120763991-43-0000
Molecular weight	236.27
Classification of the ingredient	Skin corrosion: Category 1C (H314)

Reportable ingredient

	Content (% w/w)	CAS no.	EC no. (EINECS no.)	Classification
Sodium hydroxide Reg. no. 01-2119457892-27	Max. 2.5	1310-73-2	215-185-5	Skin Corr. 1A (H314) Specific concentration limits: Eye Irrit. 2(H319): 0.5% ≤ C < 2% Skin Corr. 1A (H314): C ≥ 5% Skin Corr. 1B (H314): 2% ≤ C < 5% Skin Irrit. 2 (H315): 0.5% ≤ C < 2%

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures	In case of exposure, do not wait for symptoms to develop. Immediately start the recommended procedures below.
Inhalation	If experiencing any discomfort, immediately remove from exposure. Light cases: Keep person under surveillance. Get medical attention immediately if symptoms develop. Serious cases: Get medical attention immediately or call for an ambulance.
Skin contact	Immediately remove contaminated clothing and footwear. Flush skin with much water. Wash with water and soap. See physician immediately if irritation develops.
Eye contact	Immediately rinse eyes with much water or eyewash solution, occasionally opening eyelids. Remove contact lenses after a few minutes and rinse again. See physician immediately. Continue rinsing underway to physician, also if initial pain has subsided.
Ingestion	Let the exposed person rinse mouth and drink several glasses of water or milk, but do not induce vomiting. If vomiting does occur, let him/her rinse mouth and drink fluids again. Never give anything by mouth to an unconscious person. Make the exposed person lie down

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and keep quiet. Get medical attention immediately.

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

Causes severe irritation/burns.

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

In case of eye contact or ingestion call a physician, poison centre or hospital immediately. Describe the type and extent of exposure and the victim's condition.

It may be helpful to show this safety data sheet to physician.

Note to physician

Irritated skin should be treated as usual against effects of bases (alkali lye) or basic mists. In case lungs are affected watch for pulmonary oedema. Probable mucosal damage may contraindicate the use of gastric lavage.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Dry chemical or carbon dioxide for small fires, water spray or foam for large fires. Avoid heavy hose streams.

5.2. Special hazards arising from the substance or mixture

The essential breakdown products are volatile, toxic, malodorous, irritant and inflammable compounds such as hydrogen sulphide, isopropyl mercaptan, diisopropyl sulphide, sulphur dioxide, phosphorous pentoxide, carbon monoxide and carbon dioxide.

5.3. Advice for firefighters

Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Fight fire from protected location or maximum possible distance. Dike area to prevent water runoff. Firemen should wear self-contained breathing apparatus and protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

It is recommended to have a predetermined plan for the handling of spills. Empty, closable vessels for the collection of spills should be available.

In case of large spill (involving 10 tonnes of the product or more):

1. use personal protection equipment; see section 8
2. call emergency telephone no.; see section 1
3. alert authorities.

Observe all safety precautions when cleaning up spills. Use personal protection equipment. Depending on the magnitude of the spill this may mean wearing respirator, face mask or eye protection, chemical resistant clothing, gloves and rubber boots.

Stop the source of the spill immediately if safe to do so. Keep unprotected persons away from the spill area. Avoid and reduce mist

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formation as much as possible. Personal exposure by splashing must be avoided.

6.2. Environmental precautions

Contain the spill to prevent any further contamination of surface, soil or water. Wash waters must be prevented from entering surface water drains. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.

6.3. Methods and materials for containment and cleaning up

It is recommended to consider possibilities to prevent damaging effects of spills, such as bunding or capping. See GHS (Annex 4, Section 6).

Surface water drains should be covered if appropriate. Minor spills on the floor or other impervious surface should be absorbed onto an absorptive material such as universal binder, bentonite, Fuller's earth or other absorbent clays. Collect the contaminated absorbent in suitable containers. Clean area with much water and industrial detergent. Absorb wash liquid onto absorbent and transfer to suitable containers. The used containers should be properly closed and labelled.

Large spills which soak into the ground should be dug up and transferred to suitable containers.

Spills in water should be contained as much as possible by isolation of the contaminated water. The contaminated water must be collected and removed for treatment or disposal.

6.4. Reference to other sections

See subsection 8.2. for personal protection.
 See section 13 for disposal.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

In an industrial environment, it is recommended to avoid all personal contact with the product, if possible by using closed systems with remote system control. The material should be handled by mechanical means as much as possible. Adequate ventilation or local exhaust ventilation is required. The exhaust gases should be filtered or treated otherwise.

Remove contaminated clothing immediately. Wash thoroughly after handling. Before removing gloves, wash them with water and soap. After work, take off all work clothes and footwear. Take a shower, using water and soap. Wear only clean clothes when leaving job. Wash protective clothing and protective equipment with water and soap after each use.

Do not discharge to the environment. Collect all waste material and remains from cleaning equipment, etc., and dispose of as hazardous waste. See section 13 for disposal.

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7.2. Conditions for safe storage, including any incompatibilities

The product is stable under normal conditions of warehouse storage. To avoid freezing, store wherever possible above 0°C.

Store in labelled, tightly closed plastic drums or coated steel drums. The storage room should be constructed of incombustible material, closed, dry, ventilated and with impermeable floor, without access of unauthorised persons or children. The room should only be used for storage of chemicals. Food, drink, feed and seed should not be present. A hand wash station should be available.

7.3. Specific end use(s)

Can be used as flotation reagent (flotation collector) only.

♣ SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Personal exposure limits

To our knowledge, no personal exposure limits have been established for i-propyl-dtp-Na.

Sodium hydroxide	ACGIH (USA) TLV OSHA (USA) PEL EU, 2000/39/EC as amended Germany, MAK HSE (UK) WEL	Year	
		2015	2017
		CEILING 2 mg/m ³	8-hr TWA 2 mg/m ³
		2015	Not established
		2014	Cannot be established at present
		2011	STEL 2 mg/m ³ , 15 minutes reference period

However, other personal exposure limits defined by local regulations may exist and must be observed.

i-Propyl-dtp-Na

DNEL, inhalation, workers	2.35 mg/m ³
DNEL, dermal, workers	0.66 mg/kg bw/day
PNEC, freshwater	0.065 mg/l
PNEC, marine water	0.007 mg/l

8.2. Exposure controls

When used in a closed system, personal protection equipment will not be required. The following is meant for other situations, when the use of a closed system is not possible, or when it is necessary to open the system. Consider the need to render equipment or piping systems non-hazardous before opening.

In cases of incidental high exposure, maximal personal protection equipment may be necessary, such as respirator, face mask, chemical resistant coveralls.



Respiratory protection

In the event of an accidental discharge of the material which produces a heavy vapour or mist, workers must put on officially approved respiratory protection equipment with a universal filter type including particle filter.

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Protective gloves

Wear chemical resistant gloves, such as barrier laminate, butyl rubber or nitrile rubber. The breakthrough time of these materials for this product are unknown. Generally, however, the use of protective gloves will give only partial protection against dermal exposure. Small tears in the gloves and cross-contamination can easily occur. It is recommended to limit the work to be done manually and to change the gloves regularly.



Eye protection

Preferably wear a face shield, rather than goggles or safety glasses. It is recommended to have an eye wash fountain immediately available in the workplace when there is a potential for eye contact.



Other skin protection

Wear appropriate chemical resistant clothing to prevent skin contact depending on the extent of exposure. During most normal work situations where exposure to the material cannot be avoided for a limited time span, waterproof pants and apron of chemical resistant material or coveralls of polyethylene (PE) will be sufficient. Coveralls of PE must be discarded after use if contaminated. In cases of excessive or prolonged exposure, coveralls of barrier laminate may be required.

♣ SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state	Liquid (solution in water)
Colour	Light brown
Odour	Characteristic odour of sulphur compounds
Melting point/freezing point	-4°C
Boiling point or initial boiling point and boiling range	105°C
Flammability	Not ignitable
Lower and upper explosive limit ..	Not determined
Flash point	None. The flame is extinguished at 68°C in the Pensky-Martens closed cup test.
Auto-ignition temperature	Not autoflammable
Decomposition temperature	Not determined
pH	12 to 14
Kinematic viscosity	Not determined
Solubility	Not determined
	The product is miscible with water
Partition coefficient n-octanol/water (log value)	i-Propyl-dtp-Na : log K _{ow} = 0.6 at 22°C
Vapour pressure	Not determined
Density and/or relative density	Density: 1.14 - 1.18 g/ml at 20°C
Relative vapour density	Not determined
Particle characteristics	Not applicable (liquid)

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9.2. **Other information** No more relevant information is available.

SECTION 10: STABILITY AND REACTIVITY

- 10.1. **Reactivity** To our knowledge, the product has no special reactivities.
- 10.2. **Chemical stability** The product is stable during normal handling and storage at ambient temperatures.
- 10.3. **Possibility of hazardous reactions** An acid-base neutralisation reaction can be hazardous because of heat release.
- 10.4. **Conditions to avoid** Heating of the product will evolve harmful and irritant vapours.
- 10.5. **Incompatible materials** None known.
- 10.6. **Hazardous decomposition products** See subsection 5.2.

♣ SECTION 11: TOXICOLOGICAL INFORMATION

- 11.1. **Information on hazard classes as defined in Regulation (EC) No 1272/2008** * = Based on available data, the classification criteria are not met.

Product

- Acute toxicity The product is not expected to be harmful by single exposure. *The acute toxicity is estimated as:
- Route(s) of entry - ingestion LD₅₀, oral, rat: > 2000 mg/kg
- skin LD₅₀, dermal, rat: > 2000 mg/kg
- inhalation LC₅₀, inhalation, rat: > 5 mg/l/4 h
- Skin corrosion/irritation Causes severe irritation/burns.
- Serious eye damage/irritation Severely irritating to eyes with the potential to cause permanent eye damage.
- Respiratory or skin sensitisation ... To our knowledge, no indications of allergenic properties have been recorded. Not expected to cause hypersensitivity. *
- Germ cell mutagenicity The product contains no ingredients known to be mutagenic. *
- Carcinogenicity The product contains no ingredients known to be carcinogenic. *
- Reproductive toxicity The product contains no ingredients known to have adverse effects on reproduction. *
- STOT – single exposure To our knowledge, no specific effects after single exposure other than already mentioned have been observed. *

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STOT – repeated exposure Target organ: forestomach
 NOAEL was found to be 200 mg/kg bw/day in a 28-day study with rats (method OECD 422). At higher dose levels various effects were observed, such as slight reduction in body weight and increase in liver weight, hyperplasia and hyperkeratosis of the squamous cell epithelium of the forestomach, infiltration with neutrophilic granulocytes, granulation tissue and ulcerations.

Aspiration hazard The product contains no ingredients known to present an aspiration pneumonia hazard. *

Sodium O,O-diisopropyl dithiophosphate

Toxicokinetics, metabolism and distribution Absorption of the substance is limited. It remains extracellular, solved in body fluids. It is extensively metabolised and is converted to normal body constituents. Excretion is rapid and bioaccumulation is not expected.

Acute toxicity The substance is not expected to be harmful by single exposure, based on comparison to a similar substance. * The acute toxicity is estimated as:

Route(s) of entry - ingestion LD₅₀, oral, rat: > 2000 mg/kg
 - skin LD₅₀, dermal, rat: > 2000 mg/kg
 - inhalation LC₅₀, inhalation, rat: not available

Skin corrosion/irritation Causes severe irritation/burns to skin.

Serious eye damage/irritation Causes severe eye damage.

Respiratory or skin sensitisation ... Not expected to cause hypersensitivity. *

Sodium hydroxide

Toxicokinetics, metabolism and distribution Both sodium and hydroxide ions are normal body constituents and regulated between narrow ranges. These ranges will not be exceeded, except locally in unusual situations such as accidents.

Acute toxicity No valid studies are available. However, the existing animal and human data on acute toxicity show that sodium hydroxide has a local effect and that systemic effects are not to be expected. *

Skin corrosion/irritation Severely irritating to skin.

Serious eye damage/irritation Severely irritating to eyes with the possibility to cause permanent eye damage.

Respiratory or skin sensitisation ... To our knowledge, no indications of allergenic properties have been recorded. *

11.2. **Information on other hazards** No more relevant information is available.

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♣ SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity	Based on comparison to similar substances, the product is not expected to be toxic to aquatic organisms.
12.2. Persistence and degradability	The product is biodegradable. It undergoes degradation in the environment and in waste water treatment plants. No adverse effects are observed at concentrations up to 100 mg/l in waste water treatment plants. Degradation occurs both aerobically and anaerobically.
12.3. Bioaccumulative potential	See section 9 for n-octanol-water partition coefficient. Bioaccumulation is not expected.
12.4. Mobility in soil	In the environment the product is expected to be moderately mobile.
12.5. Results of PBT and vPvB assessment	None of the ingredients meets the criteria for being PBT or vPvB.
12.6. Endocrine disrupting properties	None of the ingredients is known to have endocrine disrupting properties.
12.7. Other adverse effects	Other relevant hazardous effects in the environment are not known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods	Remaining quantities of the material and empty but unclean packaging should be regarded as hazardous waste. Disposal of waste and packagings must always be in accordance with all applicable local regulations.
Disposal of product	According to the Waste Framework Directive (2008/98/EC), possibilities for reuse or reprocessing should first be considered. If this is not possible, the material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.
Disposal of packaging	It is recommended to consider possible ways of disposal in the following order: 1. Reuse or recycling should first be considered. If offered for recycling, containers must be emptied and triply rinsed (or equivalent). Do not discharge rinsing water to sewer systems. 2. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials. 3. Delivery of the packaging to a licensed service for disposal of hazardous waste.

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4. Disposal in a landfill or burning in open air should only occur as a last resort. For disposal in a landfill, containers should be emptied completely, rinsed and punctured to make them unusable for other purposes. If burned, stay out of smoke.

♣ SECTION 14: TRANSPORT INFORMATION

ADR/RID/IMDG/IATA/ICAO classification

14.1. UN number	1719
14.2. UN proper shipping name	Caustic alkali liquid, n.o.s. (sodium hydroxide and sodium-O,O-diisopropylthiophosphate)
14.3. Transport hazard class(es)	8
14.4. Packing group	III
14.5. Environmental hazards	May be harmful in the aquatic environment.
14.6. Special precautions for user	Avoid any unnecessary contact with the product. Misuse can result in damage to health. Do not discharge to the environment.
14.7. Maritime transport in bulk according to IMO instruments ..	The product is not transported in bulk by ship.

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture	Young people under the age of 18 are not allowed to work with the product. All ingredients are covered by EU chemical legislation.
15.2. Chemical safety assessment	Conclusions of the chemical safety assessment have been attached.

♣ SECTION 16: OTHER INFORMATION

Relevant changes in the safety data sheet	Minor corrections only.
List of abbreviations	ACGIH American Conference of Governmental Industrial Hygienists CAS Chemical Abstracts Service Dir. Directive DNEL Derived No Effect Level EC European Community EINECS European INventory of Existing Commercial Chemical Substances GHS Globally Harmonized classification and labelling System of chemicals, seventh revised edition 2017

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HSE	Health and Safety Executive, UK
IMO	International Maritime Organisation
IUPAC	International Union of Pure and Applied Chemistry
LC ₅₀	50% Lethal Concentration
LD ₅₀	50% Lethal Dose
MAK	Maximale Arbeitsplatz-Konzentration
NOAEL	No Observed Adverse Effect Level
n.o.s.	Not otherwise specified
OECD	Organisation for Economic Cooperation and Development
OSHA	Occupational Safety and Health Administration
PBT	Persistent, Bioaccumulative, Toxic
PEL	Personal Exposure Limit
PNEC	Predicted No Effect Concentration
Reg.	Registration, or Regulation
STEL	Short-Term Exposure Limit
STOT	Specific Target Organ Toxicity
TLV	Threshold Limit Value
TWA	Time Weighted Average
vPvB	very Persistent, very Bioaccumulative
WEL	Workplace Exposure Limit

References	Data on a similar substance are unpublished company data. Data on other ingredients are available from published literature and can be found several places.
Method for classification	Calculation method
Used hazard statement	H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage.
Advice on training	This material should only be used by persons who are made aware of its hazardous properties and have been instructed in the required safety precautions.

The information provided in this safety data sheet is believed to be accurate and reliable, but uses of the product vary and situations unforeseen by FMC Corporation may exist. The user has to check the validity of the information under local circumstances.

Prepared by: FMC Agricultural Solutions A/S / GHB

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ANNEX: Exposure assessment and related risk characterisation

1. Introduction

1.1. Overview of uses and exposure scenarios

The following table lists all the exposure scenarios (ES).

Table 1. Overview of exposure scenarios and contributing scenarios

Identifiers	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
ES - IW	Use at industrial site - Use at industrial site - Use at industrial site (ERC 6b) - Worker. Flotation batch process with exposure possible (PROC 5) - Worker. Transfer of substance to flotation process, outdoors (PROC 8b) - Worker. Laboratory analytical work on flotation process (PROC 15)	999.0
IW: Industrial end use at site		

1.2. Introduction to the assessment

1.2.1. Environment

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for the environment are described in the following table based on the hazard conclusions presented in the CSR.

Table 2. Type of risk characterisation required for the environment

Protection target	Type of risk characterisation	Hazard conclusion
Freshwater	Quantitative	PNEC aqua (freshwater) = 0.261 mg/L
Sediment (freshwater)	Qualitative	No exposure of sediment expected
Marine water	Quantitative	PNEC aqua (marine water) = 0.026 mg/L
Sediment (marine water)	Qualitative	No exposure of sediment expected
Sewage treatment plant	Not needed	No hazard identified
Air	Not needed	No hazard identified
Agricultural soil	Qualitative	No exposure of soil expected
Predator	Not needed	No potential for bioaccumulation

Comments on assessment approach:

The regional concentrations are reported in the CSR in section 10.2.1.2 (see Table 55, “Predicted regional exposure concentrations (Regional PEC)”). The local Predicted Exposure Concentrations (PECs) reported for each contributing scenario correspond to the sum of the local concentrations (Clocal) and the regional concentrations (PEC regional).

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1.2.2. Man via environment

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for man via the environment are described in the following table based on the hazard conclusions reported and justified in the CSR.

Table 3. Type of risk characterisation required for man via the environment

Route of exposure and type of effects	Type of risk characterisation	Hazard conclusion
Inhalation: systemic long-term	Quantitative	DNEL = 0.58 mg/m ³
Oral: systemic long-term	Quantitative	DNEL = 0.33 mg/kg bw/day

1.2.3. Workers

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for workers are described in the following table based on the hazard conclusions presented in the CSR.

Table 4. Type of risk characterisation required for workers

Route	Type of effect	Type of risk characterisation	Hazard conclusion
Inhalation	Systemic long-term	Quantitative	DNEL = 2.35 mg/m ³
	Systemic acute	Not needed	No hazard identified
	Local long-term	Qualitative	Medium hazard (no threshold derived)
	Local acute	Qualitative	Medium hazard (no threshold derived)
Dermal	Systemic long-term	Quantitative	DNEL = 0.66 mg/kg bw/day
	Systemic acute	Not needed	No hazard identified
	Local long-term	Qualitative	Medium hazard (no threshold derived)
	Local acute	Qualitative	Medium hazard (no threshold derived)
Eye	Local	Qualitative	Medium hazard (no threshold derived)

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2. Exposure scenario: Use at industrial site

Sector of use: SU 2a, Mining, (without offshore industries)

Environment contributing scenario(s):	
Use at industrial site	ERC 6b
Worker contributing scenario(s):	
Worker. Flotation batch process with exposure possible	PROC 5
Worker. Transfer of substance to flotation process, outdoors	PROC 8b
Worker. Laboratory analytical work on floatation process	PROC 15

2.1. Environmental contributing scenario 1: Use at industrial site

2.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use at site: ≤ 3 tonnes/day
• Annual use at a site: ≤ 999 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: no [effectiveness water: 0%] <i>No discharge to waste water treatment plant, all waste are either incinerated or led to holding ponds.</i>
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: no (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Discharge rate of effluent: ≥ 0 m ³ /d
• Receiving surface water flow rate: ≥ 0 m ³ /d

2.1.2. Releases

The local releases to the environment are reported in the following table.

Table 5. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification
Water	Release factor	Initial release factor: 0% Final release factor: 0% Local release rate: 0 kg/day

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Release	Release factor estimation method	Explanation / Justification
Air	Release factor	Initial release factor: 0% Final release factor: 0% Local release rate: 0 kg/day
Soil	Release factor	Final release factor: 0%

2.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 6. Exposure concentrations and risks for the environment

Protection target	Exposure concentration	Risk characterisation
Freshwater	Local PEC: 6.534E-7 mg/L	RCR < 0.01
Sediment (freshwater)		Qualitative risk characterisation (see below)
Marine water	Local PEC: 6.329E-8 mg/L	RCR < 0.01
Sediment (marine water)		Qualitative risk characterisation (see below)
Agricultural soil		Qualitative risk characterisation (see below)
Man via environment - inhalation	Local PEC: 1.071E-12 mg/m³	RCR < 0.01
Man via environment - oral	Exposure via food consumption:	
Man via environment - combined routes		RCR < 0.01

Table 7. Contribution to oral intake for man via the environment from local contribution

Type of food	Estimated daily dose	Concentration in food
Drinking water	9.22E-11 mg/kg bw/day	3.227E-9 mg/L
Fish		
Leaf crops	2.15E-10 mg/kg bw/day	1.254E-8 mg/kg ww
Root crops	2.62E-11 mg/kg bw/day	4.776E-9 mg/kg ww
Meat	5.191E-15 mg/kg bw/day	1.207E-12 mg/kg ww
Milk	6.541E-14 mg/kg bw/day	8.162E-12 mg/kg ww

Conclusion on risk characterisation

There is no exposure to sediment (fresh- and marine water), sewage treatment plant or agricultural soil. Use, transfer and laboratory work does not produce any waste intended to be released into the environment.

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2.2. Worker contributing scenario 1: Worker. Flotation batch process with exposure possible (PROC 5)

2.2.1. Conditions of use

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Concentration of substance in a mixture: < 0.01 % w/w <i>Used as 100 g pr ton ore.</i>	External tool (easyTRA)
• Duration of activity: < 8 hours (avoid carrying out activities involving exposure for more than 8 hours.)	External tool (easyTRA)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: yes (chemically resistant gloves conforming to EN374 with specific activity training) [effectiveness dermal: 95%]	External tool (easyTRA)
Other conditions affecting workers exposure	
• Place of use: outdoor	External tool (easyTRA)

2.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 8. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.004 mg/m³ (external tool (easyTRA))	RCR < 0.01
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	6.9E-5 mg/kg bw/day (external tool (easyTRA))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

The available data material suggests that the dominating local effect upon exposure to the substance, both long- and short term, will be corrosion.

Dermal corrosion is prevented by workers wearing gloves at all times when working with the substance.

Eye corrosion is prevented by workers wearing a face mask/googles/safety glasses at all times when working with the substance.

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Inhalative corrosion is prevented by working under effective local area ventilation systems. The solid substance has a low vapour pressure (below 10 Pa). Furthermore the substance is a salt and additionally it is produced in an aqueous solution. Hence it exists as ions in the solution which further lowers any inhalative exposure below a level, which could give local inhalative corrosion.

The risk management measures mentioned above (gloves, eye protection and LEV) effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure of the substance are controlled.

2.3. Worker contributing scenario 2: Worker. Transfer of substance to flotation process, outdoors (PROC 8b)

2.3.1. Conditions of use

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Concentration of substance in a mixture: 50%	External tool (easyTRA)
• Duration of activity: < 25 minutes	External tool (easyTRA)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: yes (chemically resistant gloves conforming to EN374 with specific activity training) [effectiveness dermal: 95%]	External tool (easyTRA)
Other conditions affecting workers exposure	
• Place of use: outdoor	External tool (easyTRA)

2.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.003 mg/m³ (external tool (easyTRA))	RCR = 0.427
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	0.018 mg/kg bw/day (external tool (easyTRA))	RCR = 0.027
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.454

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Conclusion on risk characterisation

The available data material suggests that the dominating local effect upon exposure to the substance, both long- and short term, will be corrosion.

Dermal corrosion is prevented by workers wearing gloves at all times when working with the substance.

Eye corrosion is prevented by workers wearing a face mask/googles/safety glasses at all times when working with the substance.

Inhalative corrosion is prevented by working under effective local area ventilation systems. The solid substance has a low vapour pressure (below 10 Pa). Furthermore the substance is a salt and additionally it is produced in an aqueous solution. Hence it exists as ions in the solution which further lowers any inhalative exposure below a level, which could give local inhalative corrosion.

The risk management measures mentioned above (gloves, eye protection and LEV) effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure of the substance are controlled.

2.4. Worker contributing scenario 3: Worker. Laboratory analytical work on floatation process (PROC 15)

2.4.1. Conditions of use

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Concentration of substance in a mixture: < 0.01 % w/w	External tool (easyTRA)
• Duration of activity: < 8 hours (avoid carrying out activities involving exposure for more than 8 hours.)	External tool (easyTRA)
Technical and organisational conditions and measures	
• Laboratory work under fume hood: yes [effectiveness inhalation: 99.99%]	External tool (easyTRA)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: yes (chemically resistant gloves conforming to EN374 with specific activity training) [effectiveness dermal: 95%]	External tool (easyTRA)

2.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 10. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.5E-7 mg/m³ (external tool (easyTRA))	RCR < 0.01
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)

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Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term	1.71E-6 mg/kg bw/day (external tool (easyTRA))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

The available data material suggests that the dominating local effect upon exposure to the substance, both long- and short term, will be corrosion.

Dermal corrosion is prevented by workers wearing gloves at all times when working with the substance.

Eye corrosion is prevented by workers wearing a face mask/googles/safety glasses at all times when working with the substance.

Inhalative corrosion is prevented by working under effective local area ventilation systems. The solid substance has a low vapour pressure (below 10 Pa). Furthermore the substance is a salt and additionally it is produced in an aqueous solution. Hence it exists as ions in the solution which further lowers any inhalative exposure below a level, which could give local inhalative corrosion.

The risk management measures mentioned above (gloves, eye protection and LEV) effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure of the substance are controlled.