

Material group	04H	Page 1 of 22
Product name	DANAFLOAT™ 262E	April 2020
Safety data sheet according to EU Reg. 1907/2006 as amended		Supersedes January 2016

SAFETY DATA SHEET

DANAFLOAT™ 262E





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™ 262E**
Contains O-isopropyl ethylthiocarbamate, benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts and isobutanol
- 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**
Company +45 97 83 53 53 (24 h; for emergencies only)
- Medical emergencies:
- | | |
|-------------------------------------|---|
| Austria: +43 1 406 43 43 | Luxembourg: +352 8002 5500 |
| 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 |
| France: +33 (0) 1 45 42 59 59 | Slovakia: +421 2 54 77 4 166 |
| Finland: +358 9 471 977 | 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) |

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SECTION 2: HAZARDS IDENTIFICATION

- 2.1. Classification of the substance or mixture**
- Flammable liquid: Category 3 (H226)
 Acute oral toxicity: Category 4 (H302)
 Skin irritation: Category 2 (H315)
 Eye damage: Category 1 (H318)
 Hazards to the aquatic environment, chronic: Category 2 (H411)
- Chemical-physical hazards The product is flammable.
- Health hazards The product may have adverse effects on fertility. See section 11. It can cause severe irritation to eyes. It is harmful by ingestion.
- Environmental hazards The product may be hazardous in the aquatic environment.
- 2.2. Label elements**
According to EU Reg. 1272/2008 as amended
- Product identifier Danafloat™ 262E
 Contains O-isopropyl ethylthiocarbamate, benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts and isobutanol
- Hazard pictograms (GHS02, GHS07, GHS05, GHS09)
- 



- Signal word Danger
- Hazard statements**
- H226 Flammable liquid and vapour.
 H302 Harmful if swallowed.
 H315 Causes skin irritation.
 H318 Causes serious eye damage.
 H411 Toxic to aquatic life with long lasting effects.
- Precautionary statements**
- P280 Wear protective gloves and eye/face protection.
 P303+P361+P353 IF ON SKIN (or hair): Remove/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.
 P362+P364 Take off contaminated clothing and wash it before reuse.
 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.

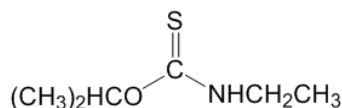
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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

- | | |
|------------------------------|--|
| 3.1. Substances | The product is a mixture, not a substance |
| 3.2. Mixtures | See section 16 for full text of hazard statements. |

Active ingredient

Thionocarbamate	Content: 53 - 58% by weight
CAS name	Carbathioc acid, ethyl-, O-(1-methylethyl) ester
CAS no.	141-98-0
EU name	O-Isopropyl ethylthiocarbamate
Other name(s)	Isopropyl ethyl thionocarbamate
	O-Isopropyl N-ethyl thiocarbamate
	O-Isopropyl ethylcarbamothioate
	Thionocarbamate
	IPETC
EC no. (EINECS no.)	205-517-7
EU index no.	None
Reg. no.	01-2119980723-30-0000
Classification of the ingredient	Acute oral toxicity: Category 4 (H302)
	Skin irritation: Category 2 (H315)
	Hazards to the aquatic environment, chronic: Category 3 (H412)
Structural formula	



Reportable ingredients

<i><u>Reportable ingredients</u></i>	Content (% w/w)	CAS no.	EC no. (EINECS no.)	Classification
Benzenesulfonic acid, mono-C11-13- branched alkyl derivs., calcium salts Reg. nr. 01-2119964467-24-0001	max. 8	11117-11-6	234-360-7	Acute Tox. 4 (H312) Skin Irrit. 2 (H315) Eye Dam. 1 (H318) Aquatic Chronic 2 (H411)
Isobutanol Reg. no. 01-2119484609-23	max. 4	78-83-1	201-148-0	Flam. Liq. 3 (H226) STOT SE 3 (H335) Skin Irrit. 2 (H315) Eye Dam. 1 (H318) STOT SE 3 (H336)

SECTION 4: FIRST AID MEASURES

- #### 4.1. Description of first aid measures

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.
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Skin contact Immediately remove contaminated clothing and footwear. Flush skin

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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, until no evidence of chemical remains. Remove contact lenses after a few minutes and rinse again. See physician immediately.

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. Get medical attention immediately.

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

4.3. **Indication of any immediate medical attention and special treatment needed** Immediate medical attention is required in case of ingestion or eye contact

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

Note to physician A specific antidote against this substance is not known. Gastric lavage and administration of activated charcoal can be considered. After decontamination, treatment is supportive and symptomatic.

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, sulphur dioxide, nitrogen oxides, 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, sealable 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

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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. Remove sources of ignition. Avoid and reduce mist formation as much as possible.

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).

Use non-sparking tools and equipment. 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 7.1. for fire prevention.
 See subsection 8.2. for personal protection.
 See section 13 for disposal.

♣ SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

The product is flammable. Formation of explosive vapour-air mixtures is possible. Fire prevention measures should be taken. Keep away from sources of ignition and protect from exposure to fire and heat. Take precautions against static discharge.

If the temperature of the liquid is below 49°C, which is 10°C below its flash point of 59°C, the fire and explosion hazard is considered minor.

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At higher temperatures the hazard gradually becomes more serious.

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 always 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.

7.2. Conditions for safe storage, including any incompatibilities

The product is stable under normal conditions of warehouse storage.

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. A warning sign reading "POISON" is recommended. 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 not established for thionocarbamate.

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

O-Isopropyl ethylthiocarbamate

DNEL, dermal	33.33 µg/kg bw/day
DNEL, inhalation	118 µg/m ³
PNEC, freshwater	0.02 mg/l
PNEC, marine water	0.002 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

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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.



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

Wear safety glasses or face shield. 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 physical and chemical properties

Appearance	Reddish brown to greenish liquid
Odour	Characteristic odour of sulphur compounds
Odour threshold	Not determined
pH	1% suspension in water: approx. 5.5 - 7.5
Melting point/freezing point	Below -30°C
Initial boiling point and boiling range	Not determined
Flash point	59°C
Evaporation rate	Not determined
Flammability (solid/gas)	Not applicable (liquid)
Upper/lower flammability or explosive limits	Not determined
Vapour pressure	Not determined
Vapour density	Not determined

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Relative density	Not determined Density: 0.97 - 1.01 g/ml at 20°C
Solubility	Not determined
Partition coefficient n-octanol/water	Thionocarbamate : log K _{ow} = 2.3 at 30°C
Autoignition temperature	Not determined
Decomposition temperature	Not determined
Viscosity	Not determined
Explosive properties	Not explosive
Oxidising properties	Not oxidising

9.2. Other information

Miscibility	The product is miscible with water.
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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	None known.
10.4. Conditions to avoid	Heating of the product will evolve harmful and irritant vapours. The product has a low flash point and can be ignited by e.g. flame, spark or hot surface.
10.5. Incompatible materials	None known.
10.6. Hazardous decomposition products	See subsection 5.2.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects	* = Based on available data, the classification criteria are not met.
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Product

Acute toxicity	The product is expected to be harmful by ingestion.
Route(s) of entry	
- ingestion	LD ₅₀ , oral, rat: 500 - 1000 mg/kg (estimated)
- skin	LD ₅₀ , dermal, rat: not available
- inhalation	LC ₅₀ , inhalation, rat: not available
Skin corrosion/irritation	Expected to be mildly to moderately irritating to skin.
Serious eye damage/irritation	Expected to be irritating to eyes.
Respiratory or skin sensitisation ...	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. *

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Reproductive toxicity	In a screening study on O-isopropyl ethylthiocarbamate (method OECD 422), decreased fertility was observed at dose level 30 mg/kg bw/day.
STOT – single exposure	To our knowledge, no specific effects after single exposure have been observed. *
STOT – repeated exposure	The following has been measured on O-isopropyl ethylthiocarbamate: NOAEL: 30 mg/kg bw/day measured in a rat study. *
Aspiration hazard	The product contains no ingredients known to present an aspiration pneumonia hazard. *
Symptoms and effects, acute and delayed	Irritation.
<u><i>O-Isopropyl ethylthiocarbamate</i></u>	
Acute toxicity	The substance is harmful by ingestion. The acute toxicity is measured as:
Route(s) of entry	- ingestion LD ₅₀ , oral, rat: 568 mg/kg (method OECD 425)
	- skin LD ₅₀ , dermal, rat: not available
	- inhalation LC ₅₀ , inhalation, rat: not available
Skin corrosion/irritation	Irritating to skin (OECD 431).
Serious eye damage/irritation	Not irritating to eyes (method OECD 405). *
Respiratory or skin sensitisation ...	Not a skin sensitizer (method OECD 429). *
<u><i>Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts</i></u>	
Toxicokinetics, metabolism and distribution	The substance is readily absorbed, rapidly metabolised and excreted within 72 hours in the bile.
Acute toxicity	The substance is harmful in contact with skin. The acute toxicity is measured as:
Route(s) of entry	- ingestion LD ₅₀ , oral, rat: > 2000 mg/kg (method OECD 401) *
	- skin LD ₅₀ , dermal, rat: 1000 - 1600 mg/kg (method OECD 402)
	- inhalation LC ₅₀ , inhalation, rat: not available
Skin corrosion/irritation	Irritating to skin.
Serious eye damage/irritation	Irritating to eyes with the possibility to cause permanent eye damage.
Respiratory or skin sensitisation ...	Not sensitising (method OECD 406). *

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Isobutanol

Toxicokinetics, metabolism and distribution

Isobutanol is rapidly absorbed following oral administration or inhalation exposure. Isobutanol is metabolised to isobutyraldehyde and isobutyric acid.

Acute toxicity

Isobutanol is not considered as harmful. * The acute toxicity is measured as:

Route(s) of entry - ingestion

LD₅₀, oral, rat (male): > 2830 mg/kg (method OECD 401)

LD₅₀, oral, rat (female): 3350 mg/kg (method OECD 401)

- skin

LD₅₀, dermal, rabbit: > 2000 mg/kg (method OECD 402)

- inhalation

LC₅₀, inhalation, rat: > 18.12 mg/l/4 h (method 40 CFR 798.1150)

Skin corrosion/irritation

Not irritating to rabbit skin (method OECD 404).

Serious eye damage/irritation

Severely irritating to eyes (method OECD 405).

Respiratory or skin sensitisation ...

Not sensitising to guinea pigs (method OECD 406). To our knowledge, no indications of allergenic properties have been recorded.
 *

SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** The product is toxic to aquatic organisms.

The following was measured on thionocarbamate:

- Fish	Rainbow trout (<i>Oncorhynchus mykiss</i>)	96-h LC ₅₀ : 1.5 mg/l
- Invertebrates	Daphnids (<i>Daphnia magna</i>)	48-h EC ₅₀ : 60 mg/l
- Algae	Green algae (<i>Pseudokirchneriella subcapitata</i>)	72-h ErC ₅₀ : 20.7 mg/l 72-h NOEC: 1.0 mg/l

12.2. **Persistence and degradability** The product is biodegradable, but does not meet the criteria for being readily biodegradable. It undergoes degradation in the environment and in waste water treatment plants.

12.3. **Bioaccumulative potential** See section 9 for 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. **Other adverse effects** Other relevant hazardous effects in the environment are not known.

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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.
 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** 1993
- 14.2. **UN proper shipping name** Flammable liquid, n.o.s. (isobutanol and O-isopropyl ethylthiocarbamate)
- 14.3. **Transport hazard class(es)** 3
- 14.4. **Packing group** III
- 14.5. **Environmental hazards** Marine pollutant
- 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.

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14.7. Transport in bulk according to Annex II of MARPOL and the IBC code

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

Seveso category (Dir. 2012/18/EU): flammable
 Second Seveso category: dangerous for the environment
 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

CAS Chemical Abstracts Service
 Dir. Directive
 DNEL Derived No Effect Level
 EC₅₀ 50% Effect Concentration
 E_rC₅₀ 50% Effect Concentration based on growth
 EINECS European INventory of Existing Commercial Chemical Substances
 GHS Globally Harmonized classification and labelling System of chemicals, Fifth revised edition 2013
 IBC International Bulk Chemical code
 IUPAC International Union of Pure and Applied Chemistry
 LC₅₀ 50% Lethal Concentration
 LD₅₀ 50% Lethal Dose
 MARPOL Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution
 NOAEL No Observed Adverse Effect Level
 NOEC No Observed Effect Concentration
 n.o.s. Not otherwise specified
 OECD Organisation for Economic Cooperation and Development
 PBT Persistent, Bioaccumulative, Toxic
 PNEC Predicted No Effect Concentration
 Reg. Registration, or Regulation
 STOT Specific Target Organ Toxicity
 vPvB very Persistent, very Bioaccumulative

References

Data on thionocarbamate are unpublished company data. Data on other ingredients are available from published literature and can be found several places.

Method for classification

Flammable liquid: test data

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Acute oral toxicity: calculation method
Skin irritation: calculation method
Eye irritation: calculation method
Hazards to the aquatic environment: calculation method

Used hazard statements H226 Flammable liquid and vapour.
H302 Harmful if swallowed.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H411 Toxic to aquatic life with long lasting effects.
H412 Harmful to aquatic life with long lasting effects.

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, with respiratoric protection (PROC 8b) - Worker. Transfer of substance to flotation process, outdoors, with no respiratoric protection, but measured exposure values (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) = 0.02 mg/L
Sediment (freshwater)	Qualitative	No exposure of sediment expected
Marine water	Quantitative	PNEC aqua (marine water) = 0.002 mg/L
Sediment (marine water)	Qualitative	No exposure of sediment expected
Sewage treatment plant	Qualitative	No emission to STP expected
Air	Not needed	No hazard identified
Agricultural soil	Qualitative	No exposure of soil expected
Predator	Not needed	No potential for bioaccumulation

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Comments on assessment approach:

The regional concentrations are reported in the CSR in section 10.2.1.2 (see Table 54, “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).

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 1. 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 = 29.99 µg/m ³
Oral: systemic long-term	Quantitative	DNEL = 17 µg/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 = 118 µg/m ³
	Systemic acute	Quantitative	DNEL = 7.05 mg/m ³
	Local long-term	Qualitative	Low hazard (no threshold derived)
	Local acute	Qualitative	Low hazard (no threshold derived)
Dermal	Systemic long-term	Quantitative	DNEL = 33.33 µg/kg bw/day
	Systemic acute	Quantitative	DNEL = 2 mg/kg bw/day
	Local long-term	Qualitative	Low hazard (no threshold derived)
	Local acute	Qualitative	Low 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, with respiratoric protection	PROC 8b
Worker. Transfer of substance to flotation process, outdoors, with no respiratoric protection, but measured exposure values	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: ≤ 10 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 sewage 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	ERC based	Initial release factor: 5% Final release factor: 5% Local release rate: 500 kg/day

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Release	Release factor estimation method	Explanation / Justification
Air	ERC based	Initial release factor: 0.1% Final release factor: 0.1% Local release rate: 10 kg/day
Soil	ERC based	Final release factor: 0.025%

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: 2.321E-4 mg/L	RCR = 0.012
Sediment (freshwater)		Qualitative risk characterisation (see below)
Marine water	Local PEC: 1.987E-5 mg/L	RCR < 0.01
Sediment (marine water)		Qualitative risk characterisation (see below)
Sewage treatment plant		Qualitative risk characterisation (see below)
Agricultural soil		Qualitative risk characterisation (see below)
Man via environment - inhalation	Local PEC: 7.759E-4 mg/m ³	RCR = 0.026
Man via environment - oral	Exposure via food consumption:	
Man via environment - combined routes		RCR = 0.026

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	3.13E-5 mg/kg bw/day	0.001 mg/L
Fish		
Leaf crops	2.765E-6 mg/kg bw/day	1.613E-4 mg/kg ww
Root crops	1.873E-5 mg/kg bw/day	0.003 mg/kg ww
Meat	3.608E-9 mg/kg bw/day	8.39E-7 mg/kg ww
Milk	1.066E-8 mg/kg bw/day	1.33E-6 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	
• Duration of activity: < 8 hours (avoid carrying out activities involving exposure for more than 8 hours.)	External tool (easyTRA)
• Concentration of substance in a mixture: < 0.01 % w/w <i>Covers substance in the mixture below 0.01 %.</i>	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	0.064 mg/m³ (external tool (easyTRA))	RCR = 0.546
Inhalation, systemic, acute	0.086 mg/m³ (external tool (easyTRA))	RCR = 0.012
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	2.06E-4 mg/kg bw/day (external tool (easyTRA))	RCR < 0.01
Dermal, systemic, acute	2.06E-4 mg/kg bw/day (external tool (easyTRA))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.552
Combined routes, systemic, acute		RCR = 0.012

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 irritation. Dermal irritation is prevented by workers wearing gloves at all times when working with the substance. Inhalative irritation is prevented by either working under effective local area ventilation systems or, when this is not available, by wearing air supplied respiratory protection or when not available, a universal filtering respiratory protective

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system, when significant chance for exposure arises. The relative low vapor pressure of the substance further lowers any inhalative exposure below a level, which could give local inhalative irritation. The risk management measures mentioned above (gloves and LEV/respiratory protection) are primarily implemented to eliminate the more severe systemic effect of exposure, but also effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure the substance are controlled.

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

2.3.1. Conditions of use

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 10 minutes	External tool (easyTRA v.3.5.0)
• Concentration of substance in a mixture: < 95 % w/w	External tool (easyTRA v.3.5.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: yes [effectiveness inhalation: 99%]	External tool (easyTRA v.3.5.0)
• Dermal protection: yes (chemically resistant gloves conforming to EN374 with specific activity training) [effectiveness dermal: 95%]	External tool (easyTRA v.3.5.0)
Other conditions affecting workers exposure	
• Place of use: outdoor	External tool (easyTRA v.3.5.0)

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	0.042 mg/m³ (external tool (easyTRA v.3.5.0))	RCR = 0.36
Inhalation, systemic, acute	4.08 mg/m³ (external tool (easyTRA v.3.5.0))	RCR = 0.579
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	0.014 mg/kg bw/day (external tool (easyTRA v.3.5.0))	RCR = 0.407
Dermal, systemic, acute	0.027 mg/kg bw/day (external tool (easyTRA v.3.5.0))	RCR = 0.014
Dermal, local, long-term		Qualitative (see below)

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Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.767
Combined routes, systemic, acute		RCR = 0.592

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 irritation. Dermal irritation is prevented by workers wearing gloves at all times when working with the substance. Inhalative irritation is prevented by either working under effective local area ventilation systems or, when this is not available, by wearing air supplied respiratory protection or when not available, a universal filtering respiratory protective system, when significant chance for exposure arises. The relative low vapor pressure of the substance further lowers any inhalative exposure below a level, which could give local inhalative irritation. The risk management measures mentioned above (gloves and LEV/respiratory protection) are primarily implemented to eliminate the more severe systemic effect of exposure, but also effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure the substance are controlled.

2.4. Worker contributing scenario 3: Worker. Transfer of substance to flotation process, outdoors, with no respiratoric protection, but measured exposure values (PROC 8b)

2.4.1. Conditions of use

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 10 minutes <i>This work process must not exceed 10 minutes per workday.</i>	External tool (easyTRA v.3.5.0)
• Concentration of substance in a mixture: < 95 % w/w	External tool (easyTRA v.3.5.0)
Technical and organisational conditions and measures	
• Measured inhalation data: 0.05 mg/m ³ <i>This exposure scenario is based on measured worker inhalation data. If such data is not available for a similar work situation, then respiratory protection must be used, see exposure scenario number 11</i>	External tool (easyTRA v.3.5.0)
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 v.3.5.0)
Other conditions affecting workers exposure	
• Place of use: outdoor	External tool (easyTRA v.3.5.0)

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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	0.05 mg/m³ (external tool (easyTRA v.3.5.0))	RCR = 0.424
Inhalation, systemic, acute	0.05 mg/m³ (external tool (easyTRA v.3.5.0))	RCR < 0.01
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	0.014 mg/kg bw/day (external tool (easyTRA v.3.5.0))	RCR = 0.407
Dermal, systemic, acute	0.027 mg/kg bw/day (external tool (easyTRA v.3.5.0))	RCR = 0.014
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.831
Combined routes, systemic, acute		RCR = 0.021

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 irritation. Dermal irritation is prevented by workers wearing gloves at all times when working with the substance. Inhalative irritation is prevented by either working under effective local area ventilation systems or, when this is not available, by wearing air supplied respiratory protection or when not available, a universal filtering respiratory protective system, when significant chance for exposure arises. The relative low vapor pressure of the substance further lowers any inhalative exposure below a level, which could give local inhalative irritation. The risk management measures mentioned above (gloves and LEV/respiratory protection) are primarily implemented to eliminate the more severe systemic effect of exposure, but also effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure to the substance are controlled.

2.5. Worker contributing scenario 4: Worker. Laboratory analytical work on floatation process (PROC 15)

2.5.1. Conditions of use

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 24 hours <i>This work process must not exceed 24 hours per workday.</i>	External tool (easyTRA v.3.5.0)

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	Method
• Concentration of substance in a mixture: < 0.01 % w/w	External tool (easyTRA v.3.5.0)
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 v.3.5.0)
Other conditions affecting workers exposure	
• Place of use: indoor	External tool (easyTRA v.3.5.0)

2.5.2. Exposure and risks for workers

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

Table 11. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.52E-4 mg/m³ (external tool (easyTRA v.3.5.0))	RCR < 0.01
Inhalation, systemic, acute	7.36E-4 mg/m³ (external tool (easyTRA v.3.5.0))	RCR < 0.01
Inhalation, local, long-term		Qualitative (see below)
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	5.14E-6 mg/kg bw/day (external tool (easyTRA v.3.5.0))	RCR < 0.01
Dermal, systemic, acute	5.14E-6 mg/kg bw/day (external tool (easyTRA v.3.5.0))	RCR < 0.01
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01
Combined routes, systemic, acute		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 irritation. Dermal irritation is prevented by workers wearing gloves at all times when working with the substance. Inhalative irritation is prevented by either working under effective local area ventilation systems or, when this is not available, by wearing air supplied respiratory protection or when not available, a universal filtering respiratory protective system, when significant chance for exposure arises. The relative low vapor pressure of the substance further lowers any inhalative exposure below a level, which could give local inhalative irritation. The risk management measures mentioned above (gloves and LEV/respiratory protection) are primarily implemented to eliminate the more severe systemic effect of exposure, but also effectively eliminates local effects. Therefore any long- or short-term risks for local effects upon exposure the substance are controlled.