Cheminova A/S Thyborønvej 78 DK-7673 Harboøre Denmark tel: +45 9690 9690 fax: +45 9690 9691 info@cheminova.com www.cheminova.com SE No. DK 12 76 00 43



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|--|----------------|-------------------------|
| Product name | DANAFLOAT™ 871 | |
| | | April 2016 |
| Safety data sheet according to EU Reg. 1907/2006 as amended Supersedes October 20 | | Supersedes October 2015 |

SAFETY DATA SHEET DANAFLOAT M 871

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

1.1. Product identifier Danafloat™ 871 Contains sodium 0,0-diisopropyl dithiophosphate,

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

sodium benzothiazol-2-yl sulphide, sodium O,O-di-secbutyl dithiophosphate and sodium hydroxide

advised against

1.3. **Details of the supplier of the safety CHEMINOVA A/S data sheet** P.O. Box 9

DK-7620 Lemvig Denmark

sds@cheminova.dk

1.4. **Emergency telephone number** ... (+45) 97 83 53 53 (24 h; for emergencies only)

SECTION 2: HAZARDS IDENTIFICATION

2.1. **Classification of the substance or** Skin corrosion: Category 1C (H314)

mixture Hazards to the aquatic environment, chronic: Category 2 (H411)

digestive tract and respiratory tract.

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 DanafloatTM 871

Contains sodium O,O-diisopropyl dithiophosphate, sodium benzothiazol-2-yl sulphide, sodium O,O-di-sec-butyl

dithiophosphate and sodium hydroxide

Hazard pictograms (GHS05, GHS09)





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| Signal word | Danger |
|--------------------------|--|
| Hazard statements | |
| H314 | Causes severe skin burns and eye damage. |
| H411 | Toxic to aquatic life with long lasting effects. |
| Precautionary statements | |
| P280 | Wear protective gloves, protective clothing and eye/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. |
| P501 | Dispose of contents/container as hazardous waste. |
| Other hazards | None of the ingredients in the product meets the criteria for being PBT or vPvB. |

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

2.3.

| 3.1. | Substances | The product is a mixture, not a substance. |
|------|---|--|
| 3.2. | Mixtures | See section 16 for full text of hazard statements. |
| | Active ingredients i-Propyl-dtp-Na CAS name | Content: 24 - 26% by weight 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 |
| | Classification of the ingredient | Skin corrosion: Category 1C (H314) |
| | Structural formula | (CH ₃) ₂ CH—O S |
| | | (CH ₃) ₂ CH—O SNa |
| | MBT-Na | Content: 11 - 12% by weight 2(3H)-Benzothiazolethione, sodium salt |

| MBT-Na | Content: 11 - 12% by weight |
|----------------------------------|---|
| CAS name | 2(3H)-Benzothiazolethione, sodium salt |
| CAS no. | 2492-26-4 |
| EU name | Sodium benzothiazole-2-yl sulphide |
| Other name(s) | Sodium 2-mercaptobenzothiazole |
| | MBT-Na |
| EC no. (EINECS no.) | 219-660-8 |
| EU index no | None |
| Classification of the ingredient | Skin corrosion: Category 1C (H314) |
| · · | Hazards to the aquatic environment, acu |

Hazards to the aquatic environment, acute: Category 1 (H400) chronic, Category 1 (H410)

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| s-Butyl-dtp-Na CAS name CAS no. IUPAC name EU name Other name(s) EC no. (EINECS no.) EU index no. Classification of the ingredient Structural formula | Phosphorod 33619-92-0 Sodium O,C Sodium O,C s-Butyl-dtp- 251-598-7 None Skin corrosi | o-di-sec-butyl o-di-sec-butyl | ,O-bis(1-methylphosphorodithioadithiophosphate | oropyl) ester, sodium salt ate |
|--|---|----------------------------------|--|-----------------------------------|
| Other reportable ingredient | Content (% w/w) | CAS no. | EC no. (EINECS no.) | Classification |
| Sodium hydroxide | max. 2 | 1310-73-2 | 215-185-5 | Skin Corr. 1A (H314) |

| SE | CTION 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 medic 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 under way to physician, also if initial pain has subsided. |
| | Ingestion | Let the exposed person rinse mouth and drink several glasses of water or milk, but not induce vomiting. If vomiting does occur, le him/her rinse mouth and drink fluids again. Never give anything be mouth to an unconscious person. Make the exposed person lie down and keep quiet. Get medical attention immediately. |
| 4.2. | Most important symptoms and effects, both acute and delayed | Causes severe irritation/burns to eyes and skin. |
| 4.3. | Indication of any immediate medical attention and special treatment needed | In case of eye contact or ingestion call a physician, poison centre hospital immediately. Describe the type and extent of exposure an 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 |

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pulmonary oedema. Probable mucosal damage may contraindicate the use of gastric lavage.

SECTION 5: FIREFIGHTING MEASURES

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, alkyl mercaptans, dialkyl sulphides, sulphur dioxide, nitrogen oxides, 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, 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
- 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 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 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).

If appropriate, surface water drains should be covered. 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 detergent and water. Absorb

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wash liquid with 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 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. 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 exclusively be used for storage of chemicals. Food, drinks, feed or seed should not be present. A hand wash station should be available.

Keep containers tightly closed. Excessive exposure to air may cause oxidation of MBT-Na and formation of insoluble material.

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 person

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

No exposure limit values have been established for MBT-Na, but a

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MAK-value has been established for 2-mercaptobenzothiazole (MBT):

| v | oor |
|---|-----|
| 1 | еаг |

MBT Germany, MAK 2015 TWA 4 mg/m³, inhalable fraction of the aerosol

Peak level 4 mg/m³

Danger of sensitization of the skin

SodiumACGIH (USA) TLV2015CEILING 2 mg/m^3 hydroxideOSHA (USA) PEL20158-hr TWA 2 mg/m^3 EU, 2000/39/EC2009Not established

as amended

Germany, MAK 2014 Cannot be established at present

HSE (UK) WEL 2011 STEL 2 mg/m³, 15 minutes reference period

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

MBT-Na

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.



Respiratory protection

In the event of an accidental discharge of the material which produces a 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 times of these materials for the 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 shift the gloves frequently and to limit the work to be done manually.



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.



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 appreciable or prolonged exposure, coveralls of barrier laminate may be required.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

| 9.1. | Information on physical and | |
|------|-----------------------------|--|
| | chemical properties | |

Appearance Yellow to brown liquid (solution in water)
Odour Characteristic odour of sulphur compounds

Upper/lower flammability or

Density: 1.14 - 1.18 g/ml at 20°C

Partition coefficient n-octanol/water Not determined; the following data are found by model calculation:

i-Propyl-dtp-Na: $\log K_{ow} = 2.9$ **s-Butyl-dtp-Na**: $\log K_{ow} = 3.8$

9.2. **Other information**

Miscibility The product is miscible with water.

SECTION 10: STABILITY AND REACTIVITY

10.2. **Chemical stability** Stable 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 produce harmful and irritant vapours.

10.5. **Incompatible materials** Acids

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.

Product

Acute toxicity The product is not expected to be harmful by inhalation, in contact

with skin or if swallowed. * The acute toxicity is estimated as:

Route(s) of entry - ingestion LD_{50} , oral, rat: > 2000 mg/kg

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| - skin - inhalation | LD_{50} , dermal, rat: > 2000 mg/kg LC_{50} , inhalation, rat: not available |
|---|--|
| Skin corrosion/irritation | Causes severe irritation/burns to skin. |
| Serious eye damage/irritation | Expected to be severely irritating to eyes with the potential to cause permanent eye damage. |
| Respiratory or skin sensitisation | The product may cause hypersensitivity in certain individuals. * |
| Germ cell mutagenicity | The product does not contain any ingredient found to be mutagenic. |
| Carcinogenicity | The product does not contain any ingredient found to be carcinogenic. * |
| Reproductive toxicity | The product does not contain any ingredient found to have adverse effects on reproduction. * |
| STOT – single exposure | Severe irritation is possible after single exposure. This is a non-specific effect. * |
| STOT – repeated exposure | The effects of chronic exposure are unknown, but must be expected to be severe. |
| Aspiration hazard | The product contains no ingredients known to present an aspiration pneumonia hazard. * |
| Symptoms and effects, acute and delayed | Severe irritation. |
| Sodium O,O-diisopropyl phosphore Acute toxicity | The substance is not expected to be harmful by single exposure, |

| Sodium O,O-diisopropyl phosphorodithioate | | | |
|--|--------------|---|--|
| 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 | LD_{50} , oral, rat: $> 2000 \text{ mg/kg}$ | |
| | - skin | LD_{50} , dermal, rat: $> 2000 \text{ mg/kg}$ | |
| | - inhalation | LC ₅₀ , 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 benzothiazol-2-yl sulphide Acute toxicity | | The substance is not harmful by ingestion or in contact with skin. * The acute toxicity is measured as: | |
| Route(s) of entry | - ingestion | LD_{50} , oral, rat: $> 2000 \text{ mg/kg}$ | |
| | - skin | LD_{50} , dermal, rabbit: $> 2000 \text{ mg/kg}$ | |

LC₅₀, inhalation, rat: not available

- inhalation

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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 ... The substance was found not to be allergenic. To our knowledge,

no indications of allergenic effects have been reported. * The parent

compound 2-mercaptobenzothiazole has allergenic properties.

<u>Sodium O,O-di-sec-butyl phosphorodithioate</u>

based on comparison to a similar substance. * The acute toxicity is

estimated as:

Route(s) of entry - ingestion LD_{50} , oral, rat: > 2000 mg/kg

- skin $LD_{50},\,dermal,\,rat:>2000\;mg/kg$

- inhalation LC₅₀, inhalation, rat: not available

Serious eye damage/irritation Causes severe eye damage.

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

Sodium hydroxide

Toxicokinetics, metabolism and

Acute toxicity

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.

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. *

SECTION 12: ECOLOGICAL INFORMATION

The acute toxicity of MBT-Na is measured as:

12.2. **Persistence and degradability** The product is biodegradable. It undergoes degradation in the

environment and in waste water treatment plants.

12.3. **Bioaccumulative potential** See section 9 for octanol-water partition coefficients.

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| | | 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. |
| SECT | TION 13: DISPOSAL CONSIDERATI | ONS |
| 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 feasible, 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 | 1719 |
|-------|----------------------------|---|
| 14.2. | UN proper shipping name | Caustic alkali liquid, n.o.s. (sodium hydroxide and sodium 2-mercaptobenzothiazole) |
| 14.3. | Transport hazard class(es) | 8 |
| 14.4. | Packing group | III |
| 14.5. | Environmental hazards | Marine pollutant |

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14.6. **Special precautions for user** Do not discharge to the environment.

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

The product should not be 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): dangerous for the environment

Young people under the age of 18 are not allowed to work with this

product.

All ingredients are covered by EU chemical legislation.

15.2. Chemical safety assessment A chemical safety assessment has not been performed.

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 EC₅₀ 50% Effect Concentration

EINECS European INventory of Existing Commercial Chemical

Substances

GHS Globally Harmonized classification and labelling System of chemicals, Fifth revised edition 2013

HSE Health & Safety Executive, UK IBC International Bulk Chemical code

IUPAC International Union of Pure and Applied Chemistry

LC₅₀ 50% Lethal Concentration

LD₅₀ 50% Lethal Dose

MAK Maximale Arbeitspaltz-Konzentration
MARPOL Set of rules from the International Maritime

Organisation (IMO) for prevention of sea pollution

n.o.s. Not otherwise specified

OSHA Occupational Safety and Health Administration

PBT Persistent, Bioaccumulative, Toxic

PEL Personal Exposure Limit

PNEC Predicted No Effect Concentration

Reg. Regulation

STEL Short-Term Exposure Limit STOT Specific Target Organ Toxicity

TLV Threshold Limit Value TWA Time Weighed Average

vPvB very Persistent, very Bioaccumulative

WEL Workplace Exposure Limit

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| | on other ingredients are available from published literature and car be found several places. | |
|---------------------------|--|---|
| Method for classification | Calculat | ion method |
| Used hazard statements | H314 H410 H411 | Causes severe skin burns and eye damage. Very toxic to aquatic life with long lasting effects. Toxic 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 Cheminova A/S may exist. The user has to check the validity of the information under local circumstances.

Prepared by: Cheminova A/S / GHB