Cheminova A/S
Thyborønvej 78
DK-7673 Harboøre
Denmark
+45 9690 9690
www.fmc.com
CVR No. DK 12 76 00 43

SAFETY DATA SHEET

3125, MALATHION 500 g/l EC

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** ..... **3125, Malathion 500 g/l EC**
Contains malathion, hydrocarbons, C10, aromatics, < 1% naphthalene and acetic anhydride

1.2. **Relevant identified uses of the substance or mixture and uses advised against** ..... Can be used as insecticide only.

1.3. **Details of the supplier of the safety data sheet**

CHEMINOVA A/S, a subsidiary of FMC Corporation
Thyborønvej 78
DK-7673 Harboøre
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
Belgium: +32 70 245 245
Bulgaria: +359 2 9154 409
Cyprus: 1401
Czech Republic: +420 224 919 293
+420 224 915 402
Denmark: +45 82 12 12 12
England and Wales: 111
Estonia: +372 7943500
France: +33 (0) 1 45 42 59 59
Finland: +358 9 471 977
Greece: 30 210 77 93 777
Hungary: +36 80 20 11 99
Ireland (Republic): +353 1 837 9964
Italy: +39 02 6610 1029
Latvia: +371 670 42 473
112
Lithuania: +370 523 62052
+370 687 53378
Luxembourg: +352 8002 5500
Netherlands: +31 30 274 88 88
Norway: +47 22 591300
Poland: +48 22 619 66 54
+48 22 619 08 97
Portugal: 808 250 143 (in Portugal only)
+351 21 330 3284
Romania: +40 21318 3606
Scotland: +8454 24 24 24
Slovakia: +421 2 54 77 4 166
Slovenia: +386 41 650 500
South Africa: +27 83 123 3911 (Bateleur Emergency Response Co.)
Spain: +34 91 562 04 20
Sweden: +46 08-331231
112
Switzerland: 145
Turkey: 114
U.S.A. & Canada: +1 800 / 331 3148 (ProPharma)
All other countries: +1 651 / 632 6793 (ProPharma - Collect)

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♣ SECTION 2: HAZARDS IDENTIFICATION

2.1. **Classification of the substance or mixture**

Eye damage: Category 1 (H318)
Sensitisation – skin: Category 1B (H317)
Aspiration hazard: Category 1 (H304)
Specific target organ toxicity – single exposure: Category 3 (H336)
Hazards to the aquatic environment, acute: Category 1 (H400)
chronic: Category 1 (H410)

WHO classification ..... Class III: slightly hazardous

Health hazards ..... The product has irritating properties.

The active ingredient **malathion** is a cholinesterase inhibitor of low mammalian toxicity. However, prolonged storage or storage at too high temperatures may induce formation of the much more toxic and synergistic contaminant isomalathion (LD_{50}, oral, rat, 89 mg/kg). Both malathion and isomalathion rapidly enter the body on contact with all skin surfaces and eyes.

Repeated exposures to cholinesterase inhibitors such as malathion or isomalathion may, without warning, cause increased susceptibility to doses of any cholinesterase inhibitor.

Environmental hazards ..... The product is very toxic to aquatic organisms.

2.2. **Label elements**

According to EU Reg. 1272/2008 as amended

Product identifier ..... 3125, Malathion 500 g/l EC
Contains malathion, hydrocarbons, C10, aromatics, < 1% naphthalene and acetic anhydride

Hazard pictograms (GHS05, GHS07, GHS08, GHS09)

Signal word ..... Danger

Hazard statements
H304 ..... May be fatal if swallowed and enters airways.
H317 ..... May cause an allergic skin reaction.
H318 ..... Causes serious eye damage.
H336 ..... May cause drowsiness or dizziness.
H410 ..... Very toxic to aquatic life with long lasting effects.

Supplementary hazard statements
EUH066 ..... Repeated exposure may cause skin dryness and cracking.
EUH401 ..... To avoid risks to human health and the environment, comply with the instructions of use.

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Precautionary statements

P261	Avoid breathing mist or vapours.
P280	Wear protective gloves and eye protection.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/container as hazardous waste.

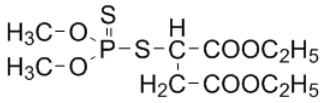
2.3. **Other hazards** ..... None of the ingredients in the product meets the criteria for being PBT or vPvB.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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

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

Active ingredient

Malathion	Content: 50% by weight
CAS name	Butanedioic acid, [(dimethoxyphosphinothioyl)thio]-, diethyl ester
CAS no.	121-75-5
IUPAC name(s)	Diethyl (dimethoxythiophosphorylthio)succinate S-[1,2-bis(Ethoxycarbonyl)ethyl] O,O-dimethyl phosphorodithioate
ISO name/EU name	Malathion
EC no. (EINECS no.)	204-497-7
EU index no.	015-041-00-X
Classification of the ingredient	Acute oral toxicity: Category 4 (H302) Sensitisation – skin: Category 1B (H317) Hazards to the aquatic environment, acute: Category 1 (H400) chronic: Category 1 (H410)
Structural formula	

Reportable ingredients	Content (% w/w)	CAS no.	EC no. (EINECS no.)	Classification
Hydrocarbons, C10, aromatics, < 1% naphthalene Reg. no. 01-2119463583-34	44		918-811-1	STOT SE 3 (H336) Asp. Tox. 1 (H304) Aquatic Chronic 2 (H411)
Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts Reg. no. 01-2119964467-24-0001	2	68953-96-8	EINECS no.: 273-234-6	Acute Tox. 4 (H312) Skin Irrit. 2 (H315) Eye Dam. 1 (H318) Aquatic Chronic 2 (H411)

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Acetic anhydride Reg. no. 01-2119486470-36	2	108-24-7	EINECS no.: 203-564-8	Flam. Liq. 3 (H226) Acute Tox. 4 (H302) Acute Tox. 4 (H332) Skin Corr. 1B (H314)

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.

Skin contact ..... Immediately remove contaminated clothing and footwear. Flush skin with much water. Wash with water and soap. See physician if any symptom 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 if irritation persists.

Ingestion ..... Let the exposed person rinse mouth with water and let him/her drink several glasses of water or milk, but not induce vomiting. If vomiting does occur, let him/her rinse mouth and drink fluids again. Get medical attention immediately.

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

Primarily irritation. On exposure to larger quantities of aged product, symptoms of poisoning (cholinesterase inhibition) may occur.

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

Immediate medical attention is required in case of ingestion.

If any of the signs of cholinesterase inhibition occurs, call a doctor (physician), clinic or hospital immediately. Explain that the victim has been exposed to malathion, an organophosphorus insecticide. Describe his/her condition and the extent of exposure. Immediately remove the exposed person from the area where the product is present.

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

In an industrial setting, the antidote atropine sulphate should be available at the workplace.

Notes to physician ..... **Malathion** is a cholinesterase inhibitor affecting the central and peripheral nervous systems producing respiratory depression.

The product contains petroleum distillates which may pose an aspiration pneumonia hazard.

Cholinesterase inhibition – treatment Decontamination procedures such as whole body washing, gastric

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lavage and administration of activated charcoal are often required.

Antidote: If symptoms of cholinesterase inhibition (see section 11) are present, administer atropine sulphate, which often is a lifesaving antidote, in large doses, TWO to FOUR mg intravenously or intramuscularly as soon as possible. Repeat at 5 to 10 minute intervals until signs of atropinisation appear and maintain full atropinisation until all organophosphate is metabolised.

Obidoxime chloride (Toxogonin), alternatively pralidoxime chloride (2-PAM), may be administered as an adjunct to, but not a substitute for atropine sulphate. Treatment with oxime should be maintained as long as atropine sulphate is administered.

At first sign of pulmonary oedema the patient should be given supplementary oxygen and treated symptomatically.

Relapse can occur after initial improvement.
VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS, DEPENDING ON THE SEVERITY OF POISONING.

Much information on (acetyl)cholinesterase inhibition and its treatment can be found on the internet.

♣ 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, dimethyl sulphide, methyl mercaptan, sulphur dioxide, carbon monoxide, carbon dioxide and phosphorus pentoxide.

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

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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. Remove sources of ignition.

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, hydrated lime, Fuller's earth or other absorbent clays. Collect the contaminated absorbent in suitable containers. Clean area with soda lye and much water. Absorb 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 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** ....

Formation of explosive vapour-air mixtures is possible. Fire prevention measures should be taken. Take measures against electrostatic discharges. Keep away from sources of ignition and protect from exposure to fire and heat.

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

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ventilation is required. The exhaust gases should be filtered or treated otherwise. For personal protection in this situation, see section 8.

For its use as a pesticide, first look for precautions and personal protection measures on the officially approved label on the packaging or for other official guidance or policy in force. If these are lacking, see section 8.

Do not wear heavily contaminated clothing. Wash thoroughly after handling. Before removing gloves, wash them with water and soap. After work, take off all work clothes and shoes. 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 use.

Inhalation of vapours of the product can cause lowered consciousness, which increases the risks of operating machinery and driving.

Do not discharge to the environment. Do not contaminate water when disposing of equipment wash waters. 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 when stored at temperatures not exceeding 25°C.

The product should never be heated above 55°C. Local heating above this temperature should be avoided as well.

Keep in closed, labelled containers. 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)** .....

The product is a registered pesticide which may only be used for the applications it is registered for, in accordance with a label approved by the regulatory authorities.

♣ SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. **Control parameters**
Personal exposure limits

		Year	
Malathion	ACGIH (USA) TLV	2015	TWA 1 mg/m^3; measured as inhalable fraction and vapor Skin notation; BEI
	OSHA (USA) PEL	2015	TWA 15 mg/m^3 total dust; skin notation
	EU, 2000/39/EC as amended	2017	Not established

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	Germany, MAK	2014	TWA 15 mg/m^3 measured as inhalable fraction of the aerosol Peak level 60 mg/m^3 BAT
	HSE (UK) WEL	2011	8-hr TWA 10 mg/m^3; skin notation

Aromatic hydrocarbons ..... 100 ppm total hydrocarbon is recommended. The mixture contains trimethyl benzene. The ACGIH recommends a TLV-TWA of 25 ppm (123 g/m^3) for trimethyl benzene.

Acetic anhydride	ACGIH (USA) TLV	2015	TWA 1 ppm (4 mg/m^3) Ceiling 3 ppm
	OSHA (USA) PEL	2015	8-hr TWA 5 ppm (20 mg/m^3)
	EU, 2000/39/EC as amended	2009	Not established
	Germany, MAK	2014	TWA 5 ppm (21 mg/m^3) Peak level 5 ppm (21 mg/m^3)
	HSE (UK) WEL	2011	8-hr TWA 0.5 ppm (2.5 mg/m^3) STEL 2 ppm (10 mg/m^3); 15-minute reference period

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

Monitoring methods ..... Persons working with this product for a longer period should have frequent blood tests of their cholinesterase levels. If the cholinesterase level falls below a critical point, no further exposure should be allowed until it has been determined by means of blood tests that the cholinesterase level has returned to normal.

Malathion

DNEL ..... Not established
EFSA has established an AOEL of 0.03 mg/kg bw/day

PNEC, aquatic ..... 1.2 ng/l

Aromatic hydrocarbons

DNEL, dermal ..... 12.5 mg/kg bw/day
DNEL, inhalation ..... 150 mg/m^3
PNEC, aquatic ..... Not applicable

Acetic anhydride

DNEL, inhalation ..... 4.2 mg/m^3
PNEC, freshwater ..... 3.058 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 case of incidental high exposure, maximal personal protection may be necessary, such as respirator, face mask, chemical resistant coveralls.

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Thyborønvej 78
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The precautions mentioned below are primarily meant for handling of the undiluted product and for preparing the spray solution, but can be recommended for spraying as well.

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 when extensive manual labour with the product is required. The breakthrough times of these materials for malathion 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 frequently.

Eye protection ..... — Wear 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 physical and chemical properties**

Appearance	Light yellow liquid
Odour	Aromatic
Odour threshold	Not determined
pH	3.7 in 1% dispersion in water
Melting point/freezing point	Not determined
Initial boiling point and boiling range	**Aromatic hydrocarbons** : 160 - 220°C
Flash point	64°C (Pensky-Martens closed cup test)
Evaporation rate	Not determined
Flammability (solid/gas)	Not applicable (liquid)
Upper/lower flammability or explosive limits	**Aromatic hydrocarbons** : 0.6 - 7 vol% (≈ 0.6 - 7.0 kPa)
Vapour pressure	**Malathion** : 4.5×10^{-4} Pa at 25°C 1.9×10^{-2} Pa at 45°C **Aromatic hydrocarbons** : 1000 Pa at 25°C

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Vapour density	(Air = 1) **Aromatic hydrocarbons** : > 1
Relative density	1.044
Solubility(ies)	Solubility of **malathion** at 20°C in: ethyl acetate > 250 g/l heptane 57 - 67 g/l water 148.2 mg/l at 25°C
Partition coefficient n-octanol/water	**Malathion** : log K_{ow} = 2.75 **Aromatic hydrocarbons** : some of the main components have log K_{ow} = 4.1 at 25°C by model calculation
Autoignition temperature	> 400ºC
Decomposition temperature	Not determined
Viscosity	6.4 mPa.s at 20ºC and 3.7 mPa.s at 40ºC
Explosive properties	Not explosive
Oxidising properties	Not oxidising

9.2. **Other information**

Miscibility ..... The product is miscible with water.

♣ SECTION 10: STABILITY AND REACTIVITY

10.1. **Reactivity** ..... To our knowledge, the product has no special reactivities.

10.2. **Chemical stability** ..... **Malathion** will decompose rapidly when heated to temperatures above 100°C, significantly increasing the risk of explosion. Direct local heating such as electric heating or by steam must be avoided.

The decomposition is dependent on time as well as temperature due to self-accelerating exothermic and autocatalytic reactions. The reactions involve rearrangements and polymerisation releasing volatile malodorous and inflammable compounds such as dimethyl sulphide and methyl mercaptan.

10.3. **Possibility of hazardous reactions** None known.

10.4. **Conditions to avoid** ..... Storage at too high temperatures may induce formation of the more toxic and synergistic contaminant isomalathion.

Heating of the product will produce harmful and irritant vapours.

10.5. **Incompatible materials** ..... Strong alkalis, amines and strong oxidising compounds. The product can corrode metals (but does not meet the criteria for classification).

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 not considered as harmful by inhalation, in contact with skin or if swallowed. * However, it may become harmful after prolonged storage or storage at too high temperatures, see subsection 2.1. The acute toxicity of a similar product was measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: > 2000 mg/kg (method FIFRA 83-1)
	- skin	LD_{50}, dermal, rat: > 2000 mg/kg (method FIFRA 83-2)
	- inhalation	LC_{50}, inhalation, rat: > 4.9 mg/l/4 h (method FIFRA 83-3)
Skin corrosion/irritation		May be mildly irritating to skin (based on calculation). *
Serious eye damage/irritation		Irritating to eyes (based on calculation).
Respiratory or skin sensitisation ...		May be skin sensitising.
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 found to have adverse effects on reproduction. *
STOT – single exposure		To our knowledge, no specific effects have been observed after single exposure. *
STOT – repeated exposure		The following has been measured on the active ingredient malathion: Target organ: nervous system LOAEL: 500 ppm (34.4 mg/kg bw/day) in a 90-day rat study. At this exposure level, minor cholinesterase inhibition was found which generally does not result in observable effects or discomfort. *
Aspiration hazard		The product presents an aspiration pneumonia hazard.
Symptoms and effects, acute and delayed		On contact, the first symptoms to appear may be irritation. On exposure to larger quantities of aged product symptoms of poisoning (cholinesterase inhibition) may occur. Symptoms of cholinesterase inhibition: nausea, headache, vomiting, cramps, weakness, blurred vision, pin-point pupils, tightness in chest, laboured breathing, nervousness, sweating, watering of eyes, drooling or frothing of mouth and nose, muscle spasms and coma.

Malathion

Toxicokinetics, metabolism and distribution	Malathion is rapidly absorbed and excreted. The highest concentration was found in the liver, followed by skin, fat, bone and gastrointestinal tract. It is extensively metabolised. There is no evidence of accumulation.
Acute toxicity	Malathion is not considered as harmful. * However, it may become

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		harmful after storage at too high temperatures, see section 2.1.
Route(s) of entry	- ingestion	LD_{50}, oral, rat: approx. 5500 mg/kg (method FIFRA 81.01)
	- skin	LD_{50}, dermal, rabbit: > 2000 mg/kg (method FIFRA 81.02)
	- inhalation	LC_{50}, inhalation, rat: > 5.02 mg/l/4 h (method FIFRA 81.03)
Skin corrosion/irritation		Slightly irritating to skin (method FIFRA 81.05). *
Serious eye damage/irritation		Slightly irritating to eyes (method FIFRA 81.04). *
Respiratory or skin sensitisation ...		Buehler test: negative (method FIFRA 81.06) Local Lymph Node Assay: negative (method OECD 429) To our knowledge, no cases of allergic reactions in humans have been reported.

Hydrocarbons, C10, aromatics, < 1% naphthalene

Acute toxicity		The substance is not considered as harmful. * The acute toxicity as measured on similar products is:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: > 5000 mg/kg (method similar to OECD 401)
	- skin	LD_{50}, dermal, rat: > 2000 mg/kg (method similar to OECD 402)
	- inhalation	LC_{50}, inhalation, rat: > 4.7 mg/l/4 h (vapour, method similar to OECD 403)
Skin corrosion/irritation		Can cause skin dryness (method similar to OECD 404).
Serious eye damage/irritation		May cause mild, short-lasting discomfort to eyes (method similar to OECD 405). *
Respiratory or skin sensitisation ...		To our knowledge, no indications of allergenic properties have been recorded. Measured on a similar substance: not a skin sensitizer (method similar to OECD 406). *
Aspiration hazard		Aromatic hydrocarbons present an aspiration hazard.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts

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.

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Serious eye damage/irritation ..... Irritating to eyes with the potential to cause permanent eye damage.

Respiratory or skin sensitisation ... Not sensitising (method OECD 406). *

Acetic anhydride

Acute toxicity ..... The substance is harmful by ingestion and inhalation. The acute toxicity is measured as:

Route(s) of entry - ingestion LD_{50}, oral, rat: 630 mg/kg (method similar to OECD 401)

- skin LD_{50}, dermal, rat: > 4000 mg/kg *

- inhalation LC_{50}, inhalation, rat: 4.0 - 8.0 mg/l/4 h

Skin corrosion/irritation ..... The substance is corrosive.

Serious eye damage/irritation ..... The substance is corrosive.

Respiratory or skin sensitisation ... Indications of allergenic properties have been recorded. Study results are equivocal.

SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** ..... **Malathion** is highly toxic to fish, aquatic invertebrates, aquatic life stages of amphibians and insects. It is less toxic to aquatic plants, birds, mammals, soil micro- and macroorganisms.

The measured ecotoxicity of the active ingredient **malathion** is:

- Fish	Rainbow trout (*Oncorhynchus mykiss*)	96 h-LC_{50}: 0.18 mg/l 37-day NOEC: 21 µg/l
- Invertebrates	Daphnids (*Daphnia magna*)	48 h-EC_{50}: 0.72 µg/l 21-day NOEC: 0.06 µg/l
- Algae	Green algae (*Selenastrum capricornutum*)	72-h IC_{50}: 4.06 mg/l
- Birds	Bobwhite quail (*Colinus virginianus*)	LD_{50}: 359 mg/kg 5-day dietary LC_{50}: 3497 mg/kg
	Mallard duck (*Anas platyrhynchos*)	LD_{50}: 1485 mg/kg
- Earthworms	*Eisenia foetida foetida*	14-day LC_{50}: 613 mg/kg soil
- Bees	Honey bees (*Apis mellifera*)	LD_{50}, acute oral: 0.38 µg/bee LD_{50}, topical: 0.27 µg/bee

12.2. **Persistence and degradability** .... **Malathion** is biodegradable, but does not meet the criteria for being readily biodegradable. It undergoes rapid degradation in the environment and in waste water treatment plants. No adverse effects are found at concentrations up to 100 mg/l in waste water treatment plants. Degradation occurs both aerobically and anaerobically, mostly biologically.

Primary degradation half-lives vary with circumstances, but are

Cheminova A/S
Thyborønvej 78
DK-7673 Harboøre
Denmark
+45 9690 9690
www.fmc.com
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usually one to a few days in aerobic soil and water.

Aromatic hydrocarbons are not readily biodegradable. However, they are expected to be degraded in the environment at a moderate rate**.**

12.3. **Bioaccumulative potential** ..... See section 9 for n-octanol/water partition coefficient.

Malathion is not expected to bioaccumulate. It is rapidly metabolised and excreted (with half-life of approx. 3 days). The measured bioconcentration factor (BCF) of malathion is 95 (average for several fish species).

Aromatic hydrocarbons have a moderate potential to bioaccumulate if continuous exposure is maintained. Most components can be metabolised by many organisms, bacteria, fungi, etc. BCFs (bioaccumulation factors) of some of the main components are 715 - 810 by model calculation.

12.4. **Mobility in soil** ..... Under normal conditions **malathion** is of medium mobility in soil but is degraded rapidly.

Aromatic hydrocarbons are not mobile in the environment, but they are highly volatile and will rapidly evaporate to the air if released into the water or on the surface of soil. They float and can migrate to sediment.

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.

♣ 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

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following order:
1. Reuse or recycling should first be considered. Reuse is prohibited except by the authorisation holder. 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**	3082
14.2.	**UN proper shipping name**	Environmentally hazardous substance, liquid, n.o.s. (malathion)
14.3.	**Transport hazard class(es)**	9
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.
14.7.	**Transport in bulk according to Annex II of MARPOL 73/78 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): dangerous for the environment. 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**	A chemical safety assessment is not required to be included for this product.

Cheminova A/S
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♣ SECTION 16: OTHER INFORMATION

Relevant changes in the safety data sheet ..... Minor corrections only.

List of abbreviations .....

ACGIH	American Conference of Governmental Industrial Hygienists
AOEL	Acceptable Operator Exposure Level
BAT	Biologischer Arbeitsstoff-Toleranzwert
BEI	Biological Exposure Index
CAS	Chemical Abstracts Service
Dir.	Directive
DNEL	Derived No Effect Level
EC	Emulsifiable Concentrate, or European Community
EC_{50}	50% Effect Concentration
EFSA	European Food Safety Authority
EINECS	European INventory of Existing Commercial Chemical Substances
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
GHS	Globally Harmonized classification and labelling System of chemicals, Fifth revised edition 2013
HSE	Health and Safety Executive
IBC	International Bulk Chemical code
IC_{50}	50% Inhibition Concentration
ISO	International Organisation for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LC_{50}	50% Lethal Concentration
LD_{50}	50% Lethal Dose
LOAEL	Lowest Observed Adverse Effect Level
MAK	Maximale Arbeitsplatz-Konzentration
MARPOL	Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution
NOEC	No Observed Effect Concentration
n.o.s.	Not otherwise specified
OECD	Organisation for Economic Cooperation and Development
OSHA	Occupational Safety and Health Administration
PBT	Persistent, Bioaccumulative, Toxic
PEL	Permissible Exposure Limit
PNEC	Predicted No Effect Concentration
Reg.	Registration or Regulation
STOT	Specific Target Organ Toxicity
TLV	Threshold Limit Value
TWA	Time Weighted Average
vPvB	very Persistent, very Bioaccumulative
WEL	Workplace Exposure Limit
WHO	World Health Organisation

References ..... Data measured on a similar product are unpublished company data.

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Data on ingredients are available from published literature and can be found several places.

Method for classification .....

Eye damage: calculation method
Sensitisation – skin: calculation method
Aspiration hazard: test data
Specific target organ toxicity – single exposure: calculation method
Hazards to the aquatic environment: calculation method

Used hazard statements .....

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
EUH066	Repeated exposure may cause skin dryness and cracking.
EUH401	To avoid risks to human health and the environment, comply with the instructions of use

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 Corporation / Cheminova A/S / GHB