

## SAFETY DATA SHEET

# CHLORPYRIFOS 480 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** ..... **CHLORPYRIFOS 480 g/l EC**  
**Contains: chlorpyrifos and solvent naphtha (petroleum), heavy aromatic**
- Trade names ..... **Chlorpyrifos 4E, Cyren, Nufos**
- 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**  
P.O. Box 9  
DK-7620 Lemvig  
Denmark  
[sds@cheminova.dk](mailto: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 mixture** ..... See section 16 for full text of R-phrases and hazard statements.
- DPD classification of the product according to Dir. 1999/45/EC as amended ..... Carc3;R40 Xn;R20/22 Xi;R38 R65 N;R50/53
- CLP classification of the product according to Reg. 1272/2008 as amended ..... Acute oral toxicity: Category 3 (H301)  
Acute inhalation toxicity: Category 4 (H332)  
Eye irritation: Category 2 (H319)  
Carcinogenicity: Category 2 (H351)  
Aspiration toxicity: Category 1 (H304)  
Hazards to the aquatic environment: Acute Category 1 (H400)  
Chronic Category 1 (H410)
- WHO classification ..... Class II: Moderately hazardous  
Guidelines to Classification 2009
- Health hazards ..... The product is harmful by inhalation and by ingestion. It has irritating properties.
- Chlorpyrifos** is a dangerous poison (cholinesterase inhibitor). It rapidly enters the body on contact with all skin surfaces and eyes. Exposed persons must receive prompt medical treatment.

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Repeated exposures to cholinesterase inhibitors such as **chlorpyrifos** may, without warning, cause increased susceptibility to doses of any cholinesterase inhibitor.

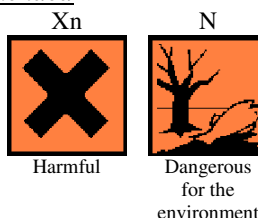
The product contains max. 5% of **naphthalene**, which is a suspected carcinogen.

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

2.2. **Label elements**

*According to Dir. 1999/45/EC as amended*

Hazard symbols .....



Contains chlorpyrifos and solvent naphtha (petroleum), heavy aromatic

R-phrases

R40 ..... Limited evidence of a carcinogenic effect.  
R20/22 ..... Harmful by inhalation and if swallowed.  
R38 ..... Irritating to skin.  
R65 ..... Harmful: may cause lung damage if swallowed.  
R50/53 ..... Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrases

S24 ..... Avoid contact with skin.  
S36/37 ..... Wear suitable protective clothing and gloves.  
S46 ..... If swallowed, seek medical advice immediately and show this container or label.  
S60 ..... This material and its container must be disposed of as hazardous waste.  
S61 ..... Avoid release to the environment. Refer to special instructions/safety data sheets.

Other mention ..... To avoid risks to man and the environment, comply with the instructions of use.

*Additional phrases for final use of the product for plant protection*

S2 ..... Keep out of the reach of children.  
S13 ..... Keep away from food, drink and animal feedingstuffs.  
S23 ..... Do not breathe spray.  
S29 ..... Do not empty into drains.  
SP1 ..... Do not contaminate water with the product or its container (Do not clean application equipment near surface water/Avoid contamination via drains from farmyards and roads).

*According to EU Reg. 1272/2008 as amended*

Product identifier ..... Chlorpyrifos 480 g/l EC  
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Hazard pictograms (GHS06, GHS08, GHS09)



Signal word .....

Danger

Hazard statements

H301 .....	Toxic if swallowed.
H332 .....	Harmful if inhaled.
H319 .....	Causes serious eye irritation.
H351 .....	Suspected of causing cancer.
H304 .....	May be fatal if swallowed and enters airways.
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.

Supplementary phrase for final use of the product for plant protection: SP1

Do not contaminate water with the product or its container (Do not clean application equipment near surface water/Avoid contamination via drains from farmyards and roads).

Precautionary statements

P261 .....	Avoid breathing vapours.
P273 .....	Avoid release to the environment.
P280 .....	Wear eye/face protection.
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.

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 R-phrases and hazard statements.

Active ingredient

**Chlorpyrifos** .....

Content: 45% by weight  
Phosphorothioic acid, O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl) ester

CAS name .....

CAS no. ....

2921-88-2

IUPAC name .....

O,O-Diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate

ISO name/EU name .....

Chlorpyrifos

EC no. (EINECS no.) .....

220-864-4

EU index no. ....

015-084-00-4

DSD classification of the ingredient

T;R25 N;R50/53

CLP classification of the ingredient

Acute oral toxicity: Category 3 (H301)

Hazards to the aquatic environment: Acute Category 1 (H400)

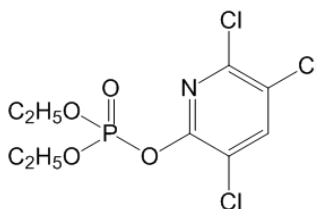
Chronic Category 1 (H410)

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Structural formula .....



Reportable ingredients

	Content (% w/w)	CAS no.	EC no. (EINECS no.)	DSD classification	CLP classification
Solvent naphtha (petroleum), heavy aromatic Reg. no. 01- 2119464588-24	51	64742-94-5	265-198-5	Carc3;R40 R65 R66 R67 N;R51/53 Harmful, dangerous for the environment	Carc. 2 (H351) STOT SE 3 (H336) Asp. Tox. 1 (H304) Aquatic Chronic 2 (H411)
Naphthalene	5	91-20-3	202-049-5	Carc3;R40 Xn;R22 N;R50/53 Harmful, dangerous for the environment	Carc. 2 (H351) Acute Tox. 4 (H302) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)
Calcium dodecylbenzene sulphonate	1.5	26264-06-2	247-557-8	Xi;R38-41 N;R51/53 Irritant, dangerous for the environment	Skin Irrit. 2 (H315) Eye Dam. 1 (H318) Aquatic Chronic 2 (H411)
2-Ethylhexan-1-ol	1	104-76-7	203-234-3	Xi;R36 Irritant	Eye Irrit. 2 (H319)

**♣ SECTION 4: FIRST AID MEASURES**

- 4.1. **Description of first aid measures** If exposure has occurred, do not wait for symptoms to develop, but immediately start the procedures described below.
- Inhalation ..... If exposure occurs, immediately remove from it. Light cases: Keep person under surveillance. Get medical attention immediately if symptoms develop. Serious cases: Get medical attention immediately or call for an ambulance.
- If breathing has stopped, immediately start artificial respiration and maintain until a physician takes charge of the exposed person.
- Skin contact ..... Immediately flush with much water while removing contaminated clothing and footwear. Wash with water and soap. See physician immediately if symptoms develop.
- 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.

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Ingestion .....	Call a doctor or get medical attention immediately. Make the exposed person rinse mouth and then drink 1 or 2 glasses of water or milk. Induce vomiting only if: 1. A significant amount (more than a mouthful) has been ingested 2. Patient is fully conscious 3. Medical aid is not readily available 4. Time since ingestion is less than one hour. Let the patient induce vomiting by touching the back of the throat with a finger. If vomiting occurs, take care that vomit does not enter airways. Let the exposed person rinse mouth and drink fluids again.
4.2. <b>Most important symptoms and effects, both acute and delayed</b>	The first symptom to appear may be irritation. 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.
4.3. <b>Indication of any immediate medical attention and special treatment needed</b>	If any sign of cholinesterase inhibition occurs, call a doctor (physician), clinic or hospital immediately. Explain that the victim has been exposed to <b>chlorpyrifos</b> , 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.  In an industrial setting the antidote atropine sulphate should be available at the workplace.  It may be helpful to show this safety data sheet to physician.
Notes to physician .....	<b>Chlorpyrifos</b> 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	Much information on (acetyl)cholinesterase inhibition by organophosphate insecticides and its treatment can be found on the internet.  Decontamination procedures such as whole body washing, gastric lavage and administration of activated charcoal are often required.  <b>Antidote:</b> If symptoms (see subsection 4.2.) 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.

#### **SECTION 5: FIREFIGHTING MEASURES**

- |   |  |
|---|--|
| 5.1. <b>Extinguishing media</b> .....                             | Dry chemical or carbon dioxide for small fires, water spray or foam for large fires. Avoid heavy hose streams.   |
| 5.2. <b>Special hazards arising from the substance or mixture</b> | The essential breakdown products are volatile, toxic, irritant, malodorous and inflammable compounds such as nitrogen oxides, hydrogen chloride, ethyl mercaptan, diethyl sulphide, sulphur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide and various chlorinated organic compounds.                            |
| 5.3. <b>Advice for firefighters</b> .....                         | 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. <b>Personal precautions, protective equipment and emergency procedures</b> | <p>It is recommended to have a predetermined plan for the handling of spills. Empty, sealable vessels for the collection of spills should be available.</p> <p>In case of large spill (involving 10 tons of the product or more):</p> <ol style="list-style-type: none"><li>1. Use personal protection equipment; see section 8</li><li>2. Call emergency telephone no.; see section 1</li><li>3. Alert authorities.</li></ol> <p>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.</p> <p>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.</p> |
| 6.2. <b>Environmental precautions</b> .....                                     | 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. <b>Methods and materials for containment and cleaning up</b>               | <p>It is recommended to consider possibilities to prevent damaging effects of spills, such as bunding or capping. See GHS (Annex 4, Section 6).</p> <p>Use non-sparking tools and equipment. If appropriate, surface</p>   |

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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, hydrated lime, bentonite or other absorbent clays. Collect the contaminated absorbent in suitable containers. Clean area with soda lye and much water. Absorb wash liquid onto absorbent and transfer to suitable containers. The used containers should be properly closed and labelled.

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** .....
- 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. Otherwise, the material should be handled by mechanical means as much as possible. Adequate ventilation or local exhaust ventilation is required. The exhaust gases should be filtered or treated otherwise. 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.
- Keep all unprotected persons and children away from working area.
- 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. Clothes that have been heavily drenched must be discarded. Do not wash and reuse them.
- Inhalation of vapours of the product can cause lowered consciousness, which increases the risks of operating machinery and driving.
- The respirator should be cleaned and filter replaced according to the accompanying instructions.
- Do not discharge to the environment. Collect all waste material and remains from cleaning equipment, etc., and dispose of as hazardous waste. See section 13 for disposal.

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- 7.2. **Conditions for safe storage, including any incompatibilities** The product is stable under normal conditions of warehouse storage. Protect against sunshine for prolonged periods.
- Keep in tightly 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 |   |
|---------------------------------|----------------------------|------|---|
| <b>Chlorpyrifos</b>             | ACGIH (USA) TLV            | 2012 | TWA 0.1 mg/m <sup>3</sup> , measured as inhalable fraction and vapour<br>Skin notation; BEI   |
|                                 | OSHA (USA) PEL             | 2012 | Not established   |
|                                 | EU, 2000/39/EC             | 2009 | Not established   |
|                                 | as amended<br>Germany, MAK | 2012 | Not established; BAT  |
|                                 | HSE (UK) WEL               | 2007 | 8-h TWA 0.2 mg/m <sup>3</sup><br>STEL 0.6 mg/m <sup>3</sup> ; 15-minute reference period<br>Skin notation   |
| <b>Naphthalene</b>              | ACGIH (USA) TLV            | 2012 | TWA 10 ppm (52 mg/m <sup>3</sup> )<br>Ceiling 15 ppm (79 mg/m <sup>3</sup> )<br>Skin notation<br>Notice of intended change (to TWA 5 ppm (25 mg/m <sup>3</sup> ))   |
|                                 | OSHA (USA) PEL             | 2012 | TWA 10 ppm (50 mg/m <sup>3</sup> )  |
|                                 | EU, 2000/39/EC             | 2009 | Not established   |
|                                 | as amended<br>Germany, MAK | 2012 | Skin notation   |
|                                 | HSE (UK) WEL               | 2007 | Not established   |
| <b>Solvent naphtha</b> .....    |                            |      | 100 ppm total hydrocarbon is recommended. Solvent naphtha contains trimethyl benzene. The ACGIH recommends a TLV-TWA of 25 ppm (123 g/m <sup>3</sup> ) for trimethyl benzene.   |
|                                 |                            |      | However, other exposure limits may be defined by local regulations and must be observed.  |
| <b>Monitoring methods</b> ..... |                            |      | 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. |



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**Chlorpyrifos**  
DNEL, systemic ..... 0.005 mg/kg bw/day  
PNEC, aquatic environment ..... 0.046 ng/l

**Solvent naphtha**  
DNEL, dermal ..... 12.5 mg/kg bw/day  
DNEL, inhalation ..... 151 mg/m<sup>3</sup>  
PNEC, aquatic environment ..... Not applicable

**Naphthalene**  
DNEL, dermal ..... 3.57 mg/kg bw/day  
DNEL, inhalation ..... 25 mg/m<sup>3</sup>  
PNEC, aquatic environment ..... 2.4 µg/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.

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 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 done manually.



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 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.

## ♣ SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on physical and chemical properties

Appearance ..... Yellow to light brown liquid

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Odour .....	Aromatic
Odour threshold .....	Not determined
pH .....	1% emulsion in water at 25°C: 5.9
Melting point/freezing point .....	Below 0°C
Initial boiling point and boiling range .....	Decomposes
	<b>Solvent naphtha</b> : 178 - 209°C
Flash point .....	70°C (Pensky-Martens closed tester)
Evaporation rate .....	(Butyl acetate = 1)
	<b>Solvent naphtha</b> : 0.05
Flammability (solid/gas) .....	Not applicable (the product is a liquid)
Upper/lower flammability or explosive limits .....	<b>Solvent naphtha</b> : 0.6 - 7.0 vol% (≈ 0.6 - 7.0 kPa)
Vapour pressure .....	<b>Chlorpyrifos</b> : 2.7 x 10 <sup>-3</sup> Pa at 25°C 1.8 x 10 <sup>-2</sup> Pa at 35°C
	<b>Solvent naphtha</b> : 100 Pa at 20°C 300 Pa at 38°C
Vapour density .....	(Air = 1)
	<b>Solvent naphtha</b> : > 1
Relative density .....	Not determined
	Density: 1.083 g/ml at 20°C
Solubility(ies) .....	<b>Chlorpyrifos</b> : miscible with toluene miscible with dichloromethane miscible with acetone miscible with ethyl acetate 774 g/l in hexane at 20°C 290 g/l in methanol at 20°C 0.94 mg/l in water at 25°C
Partition coefficient n-octanol/water .....	<b>Chlorpyrifos</b> : log K <sub>ow</sub> = 4.7
	<b>Solvent naphtha</b> : some of the main components have log K <sub>ow</sub> = 3.4 - 4.1 at 25°C by model calculation
Autoignition temperature .....	460°C
Decomposition temperature .....	Not determined (however, see subsection 10.2.)
Viscosity .....	3.6 mPa.s at 25°C 2.0 - 2.3 mPa.s at 45°C
Explosive properties .....	Not explosive
Oxidising properties .....	Not oxidising
<b>9.2. Other information</b>	
Miscibility .....	The product is emulsifiable in water.
Surface tension .....	33 mN/m at 25°C

## ♣ SECTION 10: STABILITY AND REACTIVITY

- 10.1. **Reactivity** ..... To our knowledge, the product has no special reactivities.
- 10.2. **Chemical stability** ..... **Chlorpyrifos** may decompose rapidly when heated, significantly increasing the risk of explosion. Direct local heating of the product such as electric heating or by steam must be avoided.

In tests, some variation has been found for the decomposition temperature. The variation may be due to impurities and degree of direct exposure to oxygen. Decomposition appears to be relatively slow up to 160°C, but care seems to be warranted at lower temperatures as well.

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The decomposition is to a considerable extent 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 diethyl sulphide and ethyl mercaptan.

- 10.3. **Possibility of hazardous reactions** None known.
- 10.4. **Conditions to avoid** ..... Heating of the product will produce harmful and irritant vapours.
- 10.5. **Incompatible materials** ..... Strong alkalis 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

#### Product

- Acute toxicity ..... The product is harmful by ingestion and inhalation. It is considered as less harmful by skin contact. The acute toxicity of the product is measured as:
- Route(s) of entry - ingestion LD<sub>50</sub>, oral, rat (male): 205 mg/kg (method FIFRA 81-1)
- skin LD<sub>50</sub>, dermal, rat: > 4000 mg/kg (method FIFRA 81-2)
- inhalation LC<sub>50</sub>, inhalation, rat: 2.16 mg/l/4 h (method FIFRA 81-3)
- Skin corrosion/irritation ..... Moderately irritating to skin (method FIFRA 81-5).
- Serious eye damage/irritation ..... Moderately irritating to eyes (method FIFRA 81-4)
- Respiratory or skin sensitisation ... Not allergenic in animal tests (method FIFRA 81-6). Based on available data, the classification criteria are not met. (B.o.a.d.t.c.c.a.n.m.)
- 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. 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.

#### Chlorpyrifos

- Acute toxicity ..... The substance is toxic by ingestion. Toxicity by inhalation is not known. It is considered as less harmful by skin contact. The acute toxicity is measured as:
- Route(s) of entry - ingestion LD<sub>50</sub>, oral, rat: 172 - 320 mg/kg (method FIFRA 81.01)
- skin LD<sub>50</sub>, dermal, rat: > 2000 mg/kg (method FIFRA 81.02)
- inhalation LC<sub>50</sub>, inhalation, rat: not available

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Skin corrosion/irritation .....	Slightly irritating to skin (method FIFRA 81.05). B.o.a.d.t.c.c.a.n.m.
Serious eye damage/irritation .....	Slightly irritating to eyes (method FIFRA 81.04). B.o.a.d.t.c.c.a.n.m.
Respiratory or skin sensitisation ...	Not sensitising (method FIFRA 81.06). B.o.a.d.t.c.c.a.n.m.
Germ cell mutagenicity .....	Chlorpyrifos is not mutagenic (23 studies). B.o.a.d.t.c.c.a.n.m.
Carcinogenicity .....	No carcinogenic effects have been observed for chlorpyrifos (5 studies). B.o.a.d.t.c.c.a.n.m.
Reproductive toxicity .....	No effects on fertility are found for chlorpyrifos (3 studies). Chlorpyrifos is not teratogenic (not causing birth defects) in rats at levels up to 15 mg/kg/day (a maternally toxic level)(2 studies). B.o.a.d.t.c.c.a.n.m.
STOT – single exposure .....	Mild and transient neurotoxic effects were observed for chlorpyrifos at dose level 50 mg/kg bw. B.o.a.d.t.c.c.a.n.m.
STOT – repeated exposure .....	Target organ: nervous system (cholinesterase inhibition) LOAEL: 1 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. A level for observable effects (LOEL) has not been determined. B.o.a.d.t.c.c.a.n.m.

Solvent naphtha (petroleum), heavy aromatic

Acute toxicity .....	The substance is not considered as harmful. B.o.a.d.t.c.c.a.n.m. The acute toxicity is measured as:
Route(s) of entry	
- ingestion	LD <sub>50</sub> , oral, rat: > 5000 mg/kg (method similar to OECD 401)
- skin	LD <sub>50</sub> , dermal, rat: > 2000 mg/kg (method similar to OECD 402)
- inhalation	LC <sub>50</sub> , inhalation, rat: > 4.7 mg/l/4 h (vapour, method similar to OECD 403)
Skin corrosion/irritation .....	Can cause skin dryness (measured on a similar product; method OECD 404).
Serious eye damage/irritation .....	May cause mild, short-lasting discomfort to eyes (method similar to OECD 405). B.o.a.d.t.c.c.a.n.m.
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). B.o.a.d.t.c.c.a.n.m.
Germ cell mutagenicity .....	Not mutagenic in test according to method similar to OECD 479. B.o.a.d.t.c.c.a.n.m.
Carcinogenicity .....	For petroleum solvents in general, IARC has considered the evidence for carcinogenicity as inadequate.

The product contains naphthalene, which is a suspected carcinogen.

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Reproductive toxicity .....	Not expected to cause harmful effects on reproduction (measured on similar products; methods OECD 414 and 416). B.o.a.d.t.c.c.a.n.m.
STOT – single exposure .....	Vapour may cause headache and dizziness.
STOT – repeated exposure .....	Organic solvents generally are suspected to cause irreversible damage to nervous system on repeated exposure. For some of the main components of solvent naphtha (trimethyl benzenes) this effect was found to occur in humans at a concentration level of around 0.3 mg/l during occupational exposure for periods of 10 to 21 days. LOEL: 0.3 mg/l/day.  Prolonged and/or repeated skin contact may defat the skin resulting in possible irritation and dermatitis.
Aspiration hazard .....	Solvent naphtha presents an aspiration hazard.
<u>Naphthalene</u>	
Acute toxicity .....	The substance is harmful by ingestion. The acute toxicity is measured as:
Route(s) of entry - ingestion	LD <sub>50</sub> , oral, rat: > 2000 mg/kg (method OECD 401)
	LD <sub>50</sub> , oral, mouse: 710 mg/kg (method similar to OECD 401)
- skin	LD <sub>50</sub> , dermal, rat: > 2500 mg/kg
- inhalation	LC <sub>50</sub> , inhalation, rat: > 0.4 mg/l/4 h (vapour, method similar to OECD 403)
Skin corrosion/irritation .....	Not irritating to skin (method similar to OECD 404). B.o.a.d.t.c.c.a.n.m.
Serious eye damage/irritation .....	Not irritating to eyes (method similar to OECD 405). B.o.a.d.t.c.c.a.n.m.
Respiratory or skin sensitisation ...	Not a skin sensitizer (method OECD 406). B.o.a.d.t.c.c.a.n.m.
Germ cell mutagenicity .....	Results of Chinese hamster ovary cell test were mixed (method OECD 473). Numerous other studies indicate that naphthalene is not mutagenic. B.o.a.d.t.c.c.a.n.m.
Carcinogenicity .....	Naphthalene is a suspected carcinogen (6 studies).
Reproductive toxicity .....	Naphthalene produces foetotoxicity at maternally toxic doses in animals (3 studies). Data on fertility are not available. B.o.a.d.t.c.c.a.n.m.
STOT – single exposure .....	Naphthalene may have narcotic effects at high doses. B.o.a.d.t.c.c.a.n.m.
STOT – repeated exposure .....	Organic solvents generally are suspected to cause irreversible damage to the brain on repeated exposure.  NOAEL, oral, was 133 mg/kg bw/day in a 90-day mouse study (method OECD 408), based on decreased weight of brain, liver and spleen.

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LOAEL, inhalation: 2 ppm (10 mg/m<sup>3</sup>) in a 90-day (5 days/week, 6 hrs/day) rat study (method OECD 413), based on minor histopathological changes in the nasal epithelium.  
B.o.a.d.t.c.c.a.n.m.

Aspiration hazard ..... Naphthalene presents an aspiration pneumonia hazard.

Calcium dodecylbenzene sulphonate

Acute toxicity ..... The substance is not considered as harmful by skin contact, ingestion and inhalation. B.o.a.d.t.c.c.a.n.m. The acute toxicity is measured as:

Route(s) of entry - ingestion LD<sub>50</sub>, oral, rat: 4000 mg/kg  
- skin LD<sub>50</sub>, dermal, rat: not available  
- inhalation LC<sub>50</sub>, inhalation, rat: not available

Skin corrosion/irritation ..... Irritating to skin.

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

2-Ethylhexan-1-ol

Acute toxicity ..... The substance is not considered as harmful. B.o.a.d.t.c.c.a.n.m.  
The acute toxicity is measured as:

Route(s) of entry - ingestion LD<sub>50</sub>, oral, rat: 3290 mg/kg (method OECD 401)  
- skin LD<sub>50</sub>, dermal, rat: > 3000 mg/kg (method OECD 402)  
- inhalation LC<sub>50</sub>, inhalation, rat: 0.89 - 5.3 mg/l/4 h (method OECD 403)  
Not harmful at saturated vapour pressure (approx. 0.89 mg/l).  
Harmful at 5.3 mg/l, a mixture of vapour and droplets.

Skin corrosion/irritation ..... Mildly irritating to skin. B.o.a.d.t.c.c.a.n.m.

Serious eye damage/irritation ..... Moderately to severely irritating to eyes.

Respiratory or skin sensitisation ... Not a skin sensitizer. B.o.a.d.t.c.c.a.n.m.

Germ cell mutagenicity ..... Negative in tests on Chinese hamster ovary cells (methods OECD 473 and 479). B.o.a.d.t.c.c.a.n.m.

Carcinogenicity ..... Not carcinogenic to rats and mice (method OECD 451).  
B.o.a.d.t.c.c.a.n.m.

Reproductive toxicity ..... Not expected to cause harmful effects on reproduction.  
NOAEL for maternal toxicity: 130 mg/kg bw/day  
NOAEL for teratogenicity: 650 mg/kg bw/day  
(method OECD 414). B.o.a.d.t.c.c.a.n.m.

STOT – single exposure ..... Vapour may be irritating to the respiratory tract and may cause headache and dizziness. B.o.a.d.t.c.c.a.n.m.

STOT – repeated exposure ..... Organic solvents generally are suspected to cause irreversible damage to nervous system on repeated exposure.

Prolonged and/or repeated skin contact may defat the skin resulting

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in possible irritation and dermatitis.

Target organs: liver and stomach  
NOEL: 125 mg/kg bw/day in a 90-day rat study (method OECD 408).

Aspiration hazard ..... The substance is not of a type normally considered to present an aspiration pneumonia hazard, but it may cause aspiration pneumonia depending on circumstances. B.o.a.d.t.c.c.a.n.m.

## ♣ SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** ..... The product is highly toxic to fish, aquatic invertebrates and insects. It is toxic to aquatic plants, but it is considered as less toxic to birds and not harmful to soil micro- and macroorganisms.

The acute ecotoxicity of the product is measured as:

- Fish Rainbow trout (*Salmo gairdneri*) ..... 96-h LC<sub>50</sub>: 48 µg/l
- Invertebrates Daphnids (*Daphnia magna*) ..... 48-h EC<sub>50</sub>: 2.6 µg/l
- Algae Green algae (*Selenastrum capricornutum*) ... 72-h IC<sub>50</sub>: 0.14 mg/l
- Earthworms *Eisenia foetida foetida* ..... 14-day LC<sub>50</sub>: 360 mg/kg dry soil
- Birds Bobwhite quail (*Colinus virginianus*) ..... LD<sub>50</sub>: 83 mg/kg

The following has been measured on the active ingredient **chlorpyrifos**:

- Bees Honey bees (*Apis mellifera*) ..... LD<sub>50</sub>, acute oral: 0.36 µg/bee  
LD<sub>50</sub>, topical: 0.070 µg/bee

12.2. **Persistence and degradability** .... **Chlorpyrifos** is biodegradable, but does not meet the criteria for being readily biodegradable. It undergoes 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, biologically as well as abiologically.

Primary degradation half-lives of **chlorpyrifos** vary with circumstances, but are usually around 4 - 10 weeks in soil and water. pH has a major influence. Degradation will increase at higher pH.

**Solvent naphtha** is not readily biodegradable. However, it is expected to be degraded in the environment at a moderate rate.

The product contains minor amounts of not readily biodegradable components, which may not be degradable in waste water treatment plants.

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

**Chlorpyrifos** has the potential to bioaccumulate, but is rapidly excreted (with half-life 2 - 3 days). The bioaccumulation factor of chlorpyrifos is measured to be 1375 for whole fish (rainbow trout).

**Solvent naphtha** has a moderate potential to bioaccumulate if continuous exposure is maintained. Most components can be metabolised by many organisms. Bioaccumulation factors (BCFs) of some of the main components are 246 - 810 by model calculation.

12.4. **Mobility in soil** ..... **Chlorpyrifos** is not mobile in the environment, but is strongly absorbed to soil

**Solvent naphtha** is not mobile in the environment, but it is highly volatile and will rapidly evaporate to the air if released onto water or on the surface of soil. It floats 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 feasible, the material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing.

Chlorpyrifos is rapidly hydrolysed at pH > 8.0.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Disposal of packaging ..... Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

### ♣ SECTION 14: TRANSPORT INFORMATION

- 14.1. **UN number** ..... 3018
- 14.2. **UN proper shipping name** ..... Organophosphorus pesticide, liquid, toxic (chlorpyrifos and alkyl(C3-C5)benzenes)
- 14.3. **Transport hazard class(es)** ..... 6.1
- 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 is not transported in bulk tankers.

**SECTION 15: REGULATORY INFORMATION**

- 15.1. **Safety, health and environmental regulations/legislation specific for the substance or mixture** Seveso category in Annex I, part 2, to Dir. 96/82/EC: dangerous for the environment
- The Young Worker Directive (94/33/EC) prohibits people under the age of 18 to work with this product.
- All ingredients in this product 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 SDS ..... Minor corrections only.
- List of abbreviations .....
- |                       |   |
|-----------------------|---|
| ACGIH                 | American Conference of Governmental Industrial Hygienists   |
| BAT                   | Biologische Arbeitsstoff-Toleranzwert   |
| BEI                   | Biological Exposure Index   |
| B.o.a.d.t.c.c.a.n.m.: | Based on available data, the classification criteria are not met.                                 |
| CAS                   | Chemical Abstracts Service  |
| CLP                   | Classification, Labelling and Packaging; refers to EU regulation 1272/2008 as amended             |
| Dir.                  | Directive   |
| DNEL                  | Derived No Effect Level   |
| DPD                   | Dangerous Preparation Directive; refers to Dir. 1999/45/EC as amended                             |
| DSD                   | Dangerous Substance Directive; refers to Dir. 67/548/EEC as amended                               |
| EC                    | European Community, or Emulsifiable Concentrate   |
| EC <sub>50</sub>      | 50% Effect Concentration  |
| EINECS                | European Inventory of Existing Commercial Chemical Substances                                     |
| FIFRA                 | Federal Insecticide, Fungicide and Rodenticide Act  |
| GHS                   | Globally Harmonized classification and labelling System of chemicals, Fourth revised edition 2011 |
| HSE                   | Health & Safety Executive, UK   |
| IARC                  | International Agency for Research on Cancer   |
| IBC                   | International Bulk Chemical code  |
| IC <sub>50</sub>      | 50% Inhibition Concentration  |
| ISO                   | International Organisation for Standardisation  |
| IUPAC                 | International Union of Pure and Applied Chemistry   |
| LC <sub>50</sub>      | 50% Lethal Concentration  |
| LD <sub>50</sub>      | 50% Lethal Dose   |
| LOAEL                 | Lowest Observed Adverse Effect Level  |
| LOEL                  | Lowest Observed Effect Level  |

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MAK	Maximale Arbeitspaltz-Konzentration
MARPOL	Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution
NOAEL	No Observed Adverse Effect Level
NOEL	No Observed Effect Level
OECD	Organisation for Economic Cooperation and Development
OSHA	Occupational Safety and Health Administration
PBT	Persistent, Bioaccumulative, Toxic
PE	Polyethylene
PEL	Personal Exposure Limit
PNEC	Predicted No Effect Concentration
Reg.	Regulation
R-phrased	Risk phrase
SDS	Safety Data Sheet
SE	Single Exposure
SP	Safety Precaution
S-phrased	Safety phrase
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
WHO	World Health Organisation

References .....	Data measured on a the product are unpublished company data. Data on ingredients are available from published literature and can be found several places.
Method for classification .....	Acute oral toxicity: test data Inhalation toxicity: test data Eye irritation: test data Carcinogenicity: calculation method Aspiration toxicity: calculation method Hazards to the aquatic environment, acute: test data chronic: calculation method
Used R-phrases .....	R20/22 Harmful by inhalation and if swallowed. R22 Harmful if swallowed. R25 Toxic if swallowed. R36 Irritating to eyes. R38 Irritating to skin. R40 Limited evidence of a carcinogenic effect. R41 Risk of serious damage to eyes. R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R65 Harmful: may cause lung damage if swallowed. R66 Repeated exposure may cause skin dryness and cracking. R67 Vapours may cause drowsiness and dizziness.
Used CLP hazard statements .....	H301 Toxic if swallowed. H302 Harmful if swallowed.

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- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H318 Causes serious eye damage.
- H319 Causes serious eye irritation.
- H332 Harmful if inhaled.
- H336 May cause drowsiness or dizziness.
- H351 Suspected of causing cancer.
- 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 Cheminova A/S may exist. The user has to check the validity of the information under local circumstances.

Prepared by: Cheminova A/S  
Safety, Health, Environment & Quality Department / GHB