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SAFETY DATA SHEET

ABAMECTIN 18 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**	**ABAMECTIN 18 g/l EC** **Contains abamectin, 1-hexanol, N-methyl-2-pyrrolidone**
	Trade names	**TWIGAMECTIN 18EC** *
1.2.	**Relevant identified uses of the substance or mixture and uses advised against**	Can be used as insecticide only. The product is shipped ready for the end-user or may need to be filled into its final containers.
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
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	Xn;R22 Rep2;R61 R48/20/22 Xi;R37 N;R50/53
	CLP classification of the product according to Reg. 1272/2008 as amended	Acute oral toxicity: Category 3 (H301) Toxic to reproduction: Category 1B (H360D) Specific target organ toxicity – single exposure: Category 3 (H335) Specific target organ toxicity – repeated exposure: Category 2 (H373) Hazards to the aquatic environment: Acute Category 1 (H400) Chronic Category 1 (H410)
	WHO classification ..... Guidelines to Classification 2009	Class II: Moderately hazardous
	Health hazards	The solvent N-methyl-2-pyrrolidone may cause malformations in offspring. The active ingredient abamectin is suspected to cause adverse effects on fertility and to cause birth defects. The product is harmful to toxic by ingestion. On prolonged exposure it can cause several serious effects. See section 11. Abamectin is a dangerous poison if swallowed or inhaled.

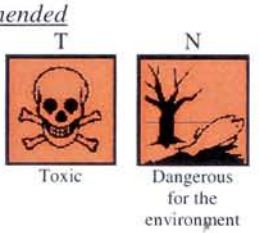
Abamectin is harmful in contact with skin. Inhalation of aerosol or spray mist is hazardous as well.

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

2.2. **Label elements**

According to Dir. 1999/45/EC as amended

Hazard symbols .....



Toxic — Dangerous for the environment

Contains abamectin, 1-hexanol, N-methyl-2-pyrrolidone

R-phrases

R22 ..... Harmful if swallowed.
R61 ..... May cause harm to the unborn child.
R48/20/22 ..... Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R37 ..... Irritating to respiratory system.
R50/53 ..... Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrases

S36/37 ..... Wear suitable protective clothing and gloves.
S53 ..... Avoid exposure – obtain special instructions before use.
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 for 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 ..... Abamectin 18 g/l EC
Contains abamectin, 1-hexanol, N-methyl-2-pyrrolidone

Hazard pictograms .....
(GHS06, GHS08, GHS09)

Signal word ..... Danger

Hazard statements	
H301	Toxic if swallowed.
H335	May cause respiratory irritation.
H360D	May damage the unborn child.
H373	May cause damage to nervous system through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.
Supplementary hazard statement	
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.
P264	Wash hands thoroughly after handling.
P281	Use personal protective equipment as required.
P310	Immediately call a POISON CENTER or doctor/physician.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P501	Dispose of contents/container in accordance with local regulations.

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

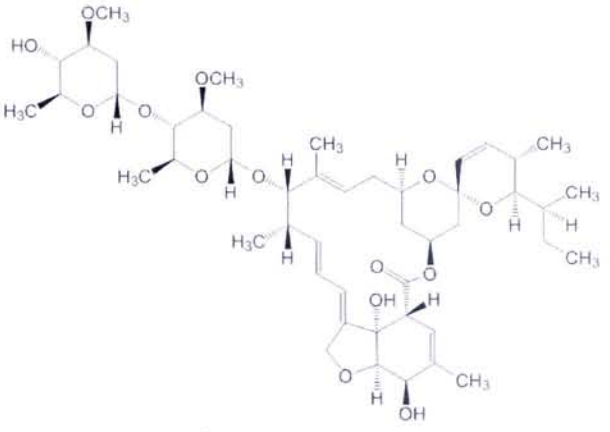
♣ SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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	
Abamectin	Content: 2% by weight
CAS name	Avermectin A1a, 5-O-demethyl-
CAS no.	65195-55-3
IUPAC name	(10*E*,14*E*,16*E*,22*Z*)-(1*R*,4*S*,5′*S*,6*S*,6′*R*,8*R*,12*S*,13*S*,20*R*,21*R*,24*S*)-= 6′-[(*S*)-*sec*-butyl]-21,24-dihydroxy-5′,11,13,22-tetramethyl-2-oxo-= 3,7,19-trioxatetracyclo[15.6.1.$1^{4,8}$.$0^{20,24}$]pentacosa-10,14,16,22-= tetraene-6-spiro-2′-(5′,6′-dihydro-2′*H*-pyran)-12-yl 2,6-dideoxy-4-= *O*-(2,6-dideoxy-3-*O*-methyl-α-L-*arabino*-hexopyranosyl)-3-*O*-= methyl-α-L-*arabino*-hexopyranoside
EC no. (EINECS no.)	265-610-3
EU index no.	–
DSD classification of the ingredient	T+;R26/28 Rep3;R63 T;R48/23/25 N;R50/53
CLP classification of the ingredient	Acute oral toxicity: Category 2 (H300) Inhalation toxicity: Category 1 (H330) Toxic to reproduction: Category 2 (H361D) Specific target organ toxicity – repeated exposure: Category 1 (H372) 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.)	DSD classification	CLP classification
1-Hexanol	29	111-27-3	203-852-3	Xn;R22 Harmful	Acute Tox. 4 * (H302)
N-Methyl-2-pyrrolidone	29	872-50-4	212-828-1	Rep2;R61 Xi;R36/37/38 Toxic	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Rep. Tox. 1B (H360D) STOT SE 3 (H335)
Distillates (petroleum), hydrotreated middle	3	64742-46-7	265-148-2	R65 R66 Harmful	Not yet available
Calcium dodecylbenzene sulphonate	max. 1.5	26264-06-2	247-557-8	Xi;R38-41 N;R51/53 Irritant, dangerous for the environment	Not yet available
2,6-Di-*tert*-butyl-*p*-cresol	1	128-37-0	204-881-4	N;R51/53 Dangerous for the environment	Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)

♣ SECTION 4: FIRST AID MEASURES

4.1. **Description of first aid measures**

In case of exposure, do not wait for symptoms to develop. Immediately start the recommended procedures below.

Inhalation .....

If experiencing any discomfort, immediately remove from exposure. Light cases: Keep person under surveillance. Get medical attention immediately if symptoms develop. Serious cases: Get medical attention immediately or call for an ambulance.

Skin contact .....

Clothing contaminated with material must be removed immediately and all skin washed thoroughly. Wash skin thoroughly with water and soap. Get medical attention 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 if irritation develops.
	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.	**Most important symptoms and effects, both acute and delayed**	Exposure causes symptoms of nervous system depression. High doses cause death by respiratory failure.
4.3.	**Indication of any immediate medical attention and special treatment needed**	If there is any sign of poisoning, call a doctor (physician), clinic or hospital immediately. Explain that the victim has been exposed to an insecticide. Describe his/her condition and the extent of exposure. Immediately remove the exposed person from the area where the product is present. Perform artificial respiration if needed. It may be helpful to show this safety data sheet to physician.
	Notes to physician	There is no specific antidote for exposure to this material. Gastric lavage and/or the administration of activated charcoal can be considered. After decontamination, treatment should be directed at the control of symptoms and the clinical condition. Since abamectin is believed to enhance GABA activity based on animal studies, it is probably wise to avoid drugs that enhance GABA activity (barbiturates, benzodiazepines, valproic acid).

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 carbon monoxide, carbon dioxide, nitrogen oxides and sulphur 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 tons of the product or more):
1) Use personal protection equipment; see section 8.
2) Call emergency telephone no.; see section 1.
3) Alert authorities.

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

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

Use non-sparking tools and equipment. Surface water drains should be covered if appropriate. Minor spills on the floor or other impervious surface should be absorbed onto an absorptive material such as universal binder, hydrated lime, Fuller's earth or other absorbent clays. Collect the contaminated absorbent in suitable containers. Rinse area with much water and detergent. 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 details of personal protection.
See section 13 for disposal.

♣ SECTION 7: HANDLING AND STORAGE

7.1. **Precautions for safe handling** .....

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

protection in this situation, see section 8.

Keep all unprotected persons and children away from working area.

Persons working with this material for a longer period should be careful to minimise exposure. See section 11. Pregnant women must avoid all work with the product, because it may damage the unborn child.

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.

The respirator must be cleaned and the filter replaced according to the accompanying instructions.

Do not discharge to the environment. See section 13 for disposal.

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.

7.2. **Conditions for safe storage, including any incompatibilities**

Storage at temperatures not exceeding 35°C is recommended.

Keep in closed, labelled containers in the dark. Protect against strong heat from sunshine or other source.

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 ..... To our knowledge not established for abamectin. An internal value of 0.02 mg abamectin/m^3 is recommended by the manufacturer.

		Year	
N-Methyl-2-pyrrolidone	ACGIH (USA) TLV	2010	Not established
	OSHA (USA) PEL	2010	Not established
	EU, 2000/39/EC as amended	2009	Not established
	Germany, MAK	2010	TWA 20 ppm (82 mg/m^3), vapour Peak level 40 ppm (164 mg/m^3), vapour Skin notation; BAT

	HSE (UK) WEL	2007	8-hr TWA: 25 ppm (103 mg/m^3) Short term exposure limit: 75 ppm (309 mg/m^3) Skin notation
2,6-Di-*tert*-butyl-p-cresol	ACGIH (USA) TLV	2010	TWA 2 mg/m^3 Measured as inhalable fraction and vapour
	OSHA (USA) PEL	2010	Not established
	EU, 2000/39/EC as amended	2009	Not established
	Germany, MAK	2010	20 mg/m^3, inhalable fraction of the aerosol Peak level 40 mg/m^3
	HSE (UK) WEL	2007	8-hr TWA 10 mg/m^3

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

Monitoring methods ..... The supplier of the safety data sheet can be contacted for monitoring methods.

DNEL/PNEC ..... Chemical Safety Report is not available.

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 following precautions 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 long 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 limit the work to be done manually and to change the gloves frequently. Be careful not to touch anything with contaminated gloves. Used gloves should be thrown out and not be reused.

Eye protection ..... Wear safety glasses or face mask. 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 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	Pale yellow liquid		
Odour	Slightly soap-like amine odour		
Odour threshold	Not determined		
pH	0.1% emulsion in water: 6.46 at 20°C		
Melting point/freezing point	Not determined		
Initial boiling point and boiling range	Not determined		
	Abamectin: decomposes		
Flash point	70°C (Pensky-Martens closed tester)		
Evaporation rate	Not determined		
Flammability (solid/gas)	Not applicable (the product is a liquid)		
Upper/lower flammability or explosive limits	**N-Methyl-2-pyrrolidone**	: 1.3 - 9.5 vol%	
	1-Hexanol	: 1.2 - 7.7 vol%	
Vapour pressure	**Abamectin**	: $< 1.0 \times 10^{-5}$ Pa at 25°C	
	N-Methyl-2-pyrrolidone	: 40 Pa at 20°C	
	1-Hexanol	: 93 Pa at 20°C	
Vapour density	Not determined		
Relative density	Not determined		
	Density: 0.962 g/ml at 20°C		
Solubility(ies)	Solubility of **abamectin** at 25°C in:		
	octanol	74.3	g/l
	methanol	12.1	g/l
	hexanes	0.00443	g/l
	water	0.00054	g/l (at 20°C)
Partition coefficient n-octanol/water	**Abamectin**	: log K_{ow} = 5.5	
	N-Methyl-2-pyrrolidone	: log K_{ow} = -0.46	
	1-Hexanol	: log K_{ow} = 2.02	
Autoignition temperature	**N-Methyl-2-pyrrolidone**	: 245°C	
	1-Hexanol	: 285°C	
Decomposition temperature	Not determined		
Viscosity	1% emulsion in water: 19.9 mPa.s at 20°C		
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**	The product has no special reactivities.
10.2.	**Chemical stability**	The product is stable during normal handling and storage at ambient temperatures.
10.3.	**Possibility of hazardous reactions**	None known.
10.4.	**Conditions to avoid**	Heating of the product will evolve harmful and irritant vapours.
10.5.	**Incompatible materials**	None known.

10.6. **Hazardous decomposition products** See subsection 5.2.

♣ SECTION 11: TOXICOLOGICAL INFORMATION

11.1. **Information on toxicological effects**

Product

Acute toxicity		The product is harmful if swallowed. It is not classified as harmful by inhalation or by skin contact, but harmful effects can occur by these routes as well. The acute toxicity is measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: 281 mg/kg (method OECD 425)
	- skin	LD_{50}, dermal, rat: > 4000 mg/kg (method OECD 402)
	- inhalation	LC_{50}, inhalation, rat: > 3.87 mg/l/4 h * signs of toxicity at this concentration (method OECD 403)
Skin corrosion/irritation		Mildly irritating to skin (method OECD 404). Based on available data, the classification criteria are not met (B.o.a.d.t.c.c.a.n.m.).
Serious eye damage/irritation		Not irritating to eyes (method OECD 405). B.o.a.d.t.c.c.a.n.m.
Respiratory or skin sensitisation		Not a skin sensitizer (method OECD 429). B.o.a.d.t.c.c.a.n.m.
Aspiration hazard		The product does not contain ingredients known to present an aspiration pneumonia hazard. B.o.a.d.t.c.c.a.n.m.
Symptoms and effects, acute and delayed		Exposure causes symptoms of nervous system depression, such as pupil dilation, vomiting, excitation, incoordination, tremors, lethargy, coma. High doses cause death by respiratory failure.

Abamectin

Acute toxicity		The substance is very toxic if swallowed and by inhalation. It is less toxic by skin contact. The acute toxicity is measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: 8.2 mg/kg (method OECD 401)
	- skin	LD_{50}, dermal, rat: > 2000 mg/kg (method OECD 402)
	- inhalation	LC_{50}, inhalation, rat: 0.031 - 0.051 mg/l/4 h (method 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 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		Abamectin did not induce chromosomal aberrations in Chinese hamster ovary cells (method OECD 473). B.o.a.d.t.c.c.a.n.m.
Carcinogenicity		Abamectin is not carcinogenic (method OECD 451 and 453). B.o.a.d.t.c.c.a.n.m.
Reproductive toxicity		Reduced mating results and birth defects were observed in animal

tests with abamectin at maternal toxic doses (3 studies).

STOT – single exposure ..... No specific effects after single exposure to abamectin have been observed. B.o.a.d.t.c.c.a.n.m.

STOT – repeated exposure ..... Target organ: primarily nervous system
Abamectin has neurotoxic effects at prolonged exposure. In animal studies apathy and general bad condition were noted at dose levels of around 10 mg abamectin/kg bw/day.
LOEL, oral: 0.5 mg/kg bw/day in an 18-week dog study (method OECD 409)
LOAEC, inhalation: 0.0027 mg/l in a 30-day rat study (6 hrs/day)

1-Hexanol

Acute toxicity ..... The substance is harmful by ingestion. It is not considered as harmful by inhalation or skin contact. The acute toxicity is measured as:

Route(s) of entry	- ingestion	LD_{50}, oral, rat: 200 - 2000 mg/kg (method OECD 401) Various numbers are quoted in literature.
	- skin	LD_{50}, dermal, rabbit: > 2000 mg/kg (method OECD 402)
	- inhalation	LC_{50}, inhalation, rat: > 21 mg/l/1 h

Skin corrosion/irritation ..... Slightly irritating to skin (method OECD 404). B.o.a.d.t.c.c.a.n.m.

Serious eye damage/irritation ..... Slightly irritating to eyes (method OECD 405). Various study results are quoted in literature. B.o.a.d.t.c.c.a.n.m.

Respiratory or skin sensitisation .... Not sensitizing to skin (method OECD 406). B.o.a.d.t.c.c.a.n.m.

Germ cell mutagenicity ..... Ames test negative. B.o.a.d.t.c.c.a.n.m.

Reproductive toxicity ..... No effects on fertility or teratogenic (birth-defects causing) effects were seen in animal tests. B.o.a.d.t.c.c.a.n.m.

STOT – repeated exposure ..... NOAEL: 1127 mg/kg bw/day from a 90-day oral toxicity study in rats. B.o.a.d.t.c.c.a.n.m.

Aspiration hazard ..... The substance is not of a type usually considered to present an aspiration pneumonia hazard, but it may cause aspiration pneumonia under certain conditions. B.o.a.d.t.c.c.a.n.m.

N-methyl-2-pyrrolidone

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

Route(s) of entry	- ingestion	LD_{50}, oral, rat: 4150 mg/kg (method OECD 401)
	- skin	LD_{50}, dermal, rat: > 5000 mg/kg (method OECD 402)
	- inhalation	LC_{50}, inhalation, rat: > 5.1 mg/l/4 h (method OECD 403)

Skin corrosion/irritation ..... Slightly irritating to skin (method OECD 404). B.o.a.d.t.c.c.a.n.m.

Serious eye damage/irritation ..... Moderately irritating to eyes (method OECD 405).

Respiratory or skin sensitisation	To our knowledge, allergenic effects have not been reported. B.o.a.d.t.c.c.a.n.m.
Germ cell mutagenicity	Negative in Chinese hamster ovary cell test (method OECD 476). B.o.a.d.t.c.c.a.n.m.
Carcinogenicity	N-methyl-2-pyrrolidone was found not to be carcinogenic in rats (methods EPA OTS 798.3300 and OECD 451) and mice (method OECD 451). B.o.a.d.t.c.c.a.n.m.
Reproductive toxicity	NOAEL for fertility and systemic toxicity was 350 mg/kg bw/day, the NOAEL for developmental toxicity was 160 mg/kg bw/day in two-generation reproduction studies with rats (method OECD 416). NOAELs for maternal toxicity and developmental toxicity appear to be debatable, but both were 125 - 250 mg/kg bw/day in an oral developmental toxicity study with rats during gestation days 6 through 20 (method OECD 414). NOAEC for maternal toxicity was 30 ppm (0.123 mg/l), NOAEC for developmental toxicity was 60 ppm (0.247 mg/l) , NOAEC for teratogenicity was 120 ppm (0.494 mg/l) in a developmental inhalation toxicity study with rats during gestation days 6 through 20 for 6 h/day (method OECD 414).
STOT – single exposure	The substance may be irritating to airways.
STOT – repeated exposure	Target organ: no specific target organ identified NOAEL 3000 ppm in food (approx. 200 mg/kg bw/day) in a 90 day oral study with rats (method OECD 408). NOAEC for systemic toxicity and local irritation was 125 ppm (0.5 mg/l) in a 90 day inhalation study (6 h/day, 5 days/week; method OECD 413). B.o.a.d.t.c.c.a.n.m.
Aspiration hazard	The substance is not of a type usually considered to present an aspiration pneumonia hazard, but it may cause aspiration pneumonia under certain conditions. B.o.a.d.t.c.c.a.n.m.

Distillates (petroleum), hydrotreated middle

Acute toxicity		The substance is not considered as harmful by single exposure. However, harmful effects may occur by inhalation. The acute toxicity is measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: > 5000 mg/kg (method OECD 401)
	- skin	LD_{50}, dermal, rabbit: > 2000 mg/kg (measured on a similar product, method OECD 402)
	- inhalation	LC_{50}, inhalation, rat: 4.6 mg/l/4 h (measured on a similar product, method OECD 403)
Skin corrosion/irritation		Irritating to skin (measured on a similar product, method OECD 404).
Serious eye damage/irritation		Mildly to moderately irritating to eyes (measured on a similar product, method OECD 405). B.o.a.d.t.c.c.a.n.m.

Respiratory or skin sensitisation	Not sensitizing to skin (measured on a similar product, method OECD 406). B.o.a.d.t.c.c.a.n.m.
Germ cell mutagenicity	In some tests on similar substances equivocal results were observed. The weight of evidence is that petroleum distillates generally are not genotoxic. 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. B.o.a.d.t.c.c.a.n.m. The product does not contain relevant amounts of any aromatic hydrocarbon identified as carcinogenic.
Reproductive toxicity	In tests on similar substances no effects on fertility or teratogenic (birth-defects causing) effects were seen at maternal non-toxic doses. B.o.a.d.t.c.c.a.n.m.
STOT – single exposure	Inhalation may cause irritation of airways.
STOT – repeated exposure	Prolonged/repeated contact may defat the skin which can lead to dermatitis. LOEL by dermal contact: 2000 mg/kg bw/day in a 28 day study on a similar substance with rabbits (method OECD 410). LOEL by inhalation: 23 mg/m^3 in a 28-day toxicity study on a similar substance in rats (6 h/day, 5 days/week, method OECD 412).
Aspiration hazard	The substance 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_{50}, oral, rat: 4000 mg/kg
	- skin	LD_{50}, dermal, rat: not available
	- inhalation	LC_{50}, 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.

2,6-Di-tert-butyl-p-cresol

Acute toxicity		The product is not considered as harmful by inhalation, ingestion or skin contact. B.o.a.d.t.c.c.a.n.m. The acute toxicity is measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: > 2930 mg/kg (method OECD 401)
	- skin	LD_{50}, dermal, rat: > 2000 mg/kg (method OECD 402)
	- inhalation	LC_{50}, inhalation, rat: not accessible
Skin corrosion/irritation		Not irritating to skin (method OECD 404). B.o.a.d.t.c.c.a.n.m.
Serious eye damage/irritation		Not irritating to eyes (method OECD 405). B.o.a.d.t.c.c.a.n.m.

Respiratory or skin sensitisation	Negative in human patch test. B.o.a.d.t.c.c.a.n.m.
Germ cell mutagenicity	The majority of the mutagenicity tests on germ cells were negative. B.o.a.d.t.c.c.a.n.m.
Carcinogenicity	In a number of studies 2,6-di-*tert*-butyl-*p*-cresol was found not to be carcinogenic. B.o.a.d.t.c.c.a.n.m.
Reproductive toxicity	2,6-Di-*tert*-butyl-*p*-cresol had no adverse effects on fertility at maternal non-toxic doses in several studies. No signs of teratogenicity (birth defects) were found at maternal non-toxic doses. B.o.a.d.t.c.c.a.n.m.
STOT – single exposure	Specific effects by single exposure are not observed at relevant dosages. B.o.a.d.t.c.c.a.n.m.
STOT – repeated exposure	In a chronic test with rats the main effect was increased liver weight found at dose level 450 mg/kg bw/day. In several other studies similar results were found. B.o.a.d.t.c.c.a.n.m.
Aspiration hazard	The substance is not of a type usually considered to present an aspiration pneumonia hazard, but it may cause aspiration pneumonia under certain conditions. B.o.a.d.t.c.c.a.n.m.

♣ SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** ..... The product is very toxic to fish, aquatic invertebrates, aquatic life stages of amphibians and insects. It is harmful to aquatic plants. It is not considered as harmful to birds and soil macro- and microorganisms.

The ecotoxicity as measured on a similar product is:

- Fish	Rainbow trout (*Oncorhynchus mykiss*)	96-h LC_{50}: 0.201 mg/l
	Common carp (*Cyprinus carpio*)	96-h LC_{50}: 3.28 mg/l
- Invertebrates	Daphnids (*Daphnia magna*)	48-h EC_{50}: 0.038 mg/l
		21-day NOEC: 1.26 µg/l
- Algae	Green algae (*Desmodesmus subspicatus*)	72-h EC_{50}: 66.8 mg/l
- Birds	Japanese quail (*Coturnix coturnix japonica*)	LD_{50}: > 2000 mg/kg
- Earthworms	*Eisenia fetida*	14-day LC_{50}: 446 mg/kg dry soil
- Insects	Honey bees (*Apis mellifera*)	48-h LC_{50}, oral: 4.17 µg/bee

12.2. **Persistence and degradability** .... **Abamectin** is not readily biodegradable. However, it undergoes degradation in the environment and in waste water treatment plants. Primary degradation half-lives vary with circumstances from 14 to 20 days in different soil types. Abamectin is degraded photochemically in soil and water as well.

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.

Abamectin is not expected to bioaccumulate. The Bioconcentration

Factor (BCF) was measured to be 54 in zebrafish (*Danio rerio*; whole fish).

12.4. **Mobility in soil** ..... **Abamectin** is mobile in soil.

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.

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.

Containers can by 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.

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

Disposal of waste and packagings must always be in accordance with all applicable local regulations.

♣ SECTION 14: TRANSPORT INFORMATION

ADR/RID/IMDG/IATA/ICAO classification

14.1. **UN number** 2902

14.2. **UN proper shipping name** ..... Pesticide, liquid, toxic, n.o.s. (Abamectin)

14.3. **Transport hazard class(es)** 6.1

14.4. **Packing group** III

14.5. **Environmental hazards** ..... Marine pollutant

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: toxic.

The employer shall assess any risks to the safety or health and any possible effect on the pregnancies or breastfeeding of workers and decide what measures should be taken (Dir. 92/85/EEC).

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 carried out.

♣ SECTION 16: OTHER INFORMATION

Relevant changes in the SDS ..... Numerous changes have been made to bring the safety data sheet in line with Reg. 453/2010, but these do not involve essential new information about hazardous properties

List of abbreviations .....

ACGIH	American Conference of Governmental Hygienists
BAT	Biologische Arbeitsstoff-Toleranzwerte
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 EU directive 1999/45/EC
DSD	Dangerous Substance Directive; refers to EU directive 67/548/EEC
EC	European Community or Emulsifiable Concentrate
EC_{50}	50% Effect Concentration
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA OTS	Environmental Protection Agency (USA) Office of Toxic Substances
GABA	γ-Aminobutyric acid, chief inhibitory neurotransmitter in central nervous system
GHS	Globally Harmonized classification and labelling System of chemicals, Third revised edition 2009
HSE	Health and Safety Executive
IARC	International Agency for Research on Cancer
IBC	International Bulk Chemical code
IUPAC	International Union of Pure and Applied Chemistry
LC_{50}	50% Lethal Concentration
LD_{50}	50% Lethal Dose
LOAEC	Lowest Observed Adverse Effect Concentration
LOEL	Lowest Observed Effect Level
MAK	Maximale Arbeitsplatz-Konzentration
MARPOL	Set of rules from the International Maritime

	Organisation (IMO) for prevention of sea pollution
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
OSHA	Occupational Safety and Health Administration
PBT	Persistent, Bioaccumulative, Toxic
PEL	Personal Exposure Limit
PNEC	Predicted No Effect Concentration
Reg.	Regulation
R-phrase	Risk phrase
SDS	Safety data sheet
S-phrase	Safety phrase
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 ..... Acute toxicity and ecotoxicity data 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 date
Toxic to reproduction: calculation rules
Specific target organ toxicity – single exposure: calculation rules
Specific target organ toxicity – repeated exposure: calculation rules
Hazards to the aquatic environment: Acute: test data
Chronic: calculation rules

Used R-phrases .....

R22	Harmful if swallowed.
R26/28	Very toxic by inhalation and if swallowed.
R36/37/38	Irritating to eyes, respiratory system and skin.
R37	Irritating to respiratory system.
R38	Irritating to skin.
R41	Risk of serious damage to eyes.
R48/20/22	Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/23/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
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.
R61	May cause harm to the unborn child.
R63	Possible risk of harm to the unborn child.
R65	Harmful: may cause lung damage if swallowed.
R66	Repeated exposure may cause skin dryness or cracking.

Used CLP hazard statements .....

H300	Fatal if swallowed.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H315	Causes skin irritation.

H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H360D	May damage the unborn child.
H361D	Suspected of damaging the unborn child.
H372	Causes damage to nervous system through prolonged or repeated exposure.
H373	May cause damage to nervous system through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
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