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Product identifier



Material group	45A/4510	Page 1 of 12
Product name	GLYPHOSATE 360 g/l SL	
		April 2016
Safety data sheet according to EU Reg. 1907/2006 as amended Supersedes January		Supersedes January 2015

SAFETY DATA SHEET GLYPHOSATE 360 g/l SL

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

SECTI	SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING		
1.1.	Product identifier	GLYPHOSATE 360 g/I SL	
	Trade name	GLYFOS	
1.2.	Relevant identified uses of the substance or mixture and uses advised against	Can be used as herbicide 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	
1.4.	Emergency telephone number	(+45) 97 83 53 53 (24 h; for emergencies only)	
♣ SEC	TION 2: HAZARDS IDENTIFICATION		
2.1.	Classification of the substance or mixture	Hazards to the aquatic environment, acute: Category 1 (H400) chronic: Category 2 (H411)	
	WHO classification	Class U (Unlikely to present acute hazard in normal use)	
	Health hazards	The product can cause moderate to severe but temporary eye irritation. It may be slightly irritating to skin, airways and the upper digestive tract, especially on prolonged contact.	
	Environmental hazards	The product is a herbicide and is therefore expected to be harmful to all green plants.	
2.2.	Label elements According to EU Reg. 1272/2008 a	s amended	

Glyphosate 360 g/l SL

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Hazard pictogram (GHS09)



Signal word Warning

Hazard statement

Supplementary hazard statement

the instructions of use.

Precautionary statements

P273 Avoid release to the environment.

P391 Collect spillage.

P501 Dispose of contents/container as hazardous waste.

PBT or vPvB.

♣ SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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

The product contains 486 g/l of the pure active ingredient glyphosate as its isopropylamine salt, equivalent to 360 g/l of the

free acid glyphosate.

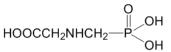
Glyphosate Content: 31% by weight

CAS name Glycine, N-(phosphonomethyl)-

Classification of the ingredient Eye damage: Category 1 (H318)

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

Structural formula



Glyphosate isopropylamine salt Content: 42% by weight

CAS name Glycine, N-(phosphonomethyl)-, compd. with 2-propanamine (1:1)

IUPAC name –

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015-184-00-8 EU index no. Classification of the ingredient Hazards to the aquatic environment, chronic: Category 2 (H411) Structural formula

$$\begin{array}{ccc}
& O \\
\parallel & OH \\
HOOCCH_2NHCH_2-P & O^{-} & H_3N^{\dagger}-CH(CH_3)_2
\end{array}$$

Reportable ingredient Content CAS no. EC no. Classification (EINECS no.) (% w/w)

Tallow alkylamine ethoxylate 61791-26-2 Acute Tox. 4 (H302) None

> Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Aquatic Acute 1 (H400)

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 Remove contaminated clothing and footwear. Flush skin with

water. Wash with water and soap. See physician if irritation

develops.

Eye contact Immediately rinse eyes with much water or eyewash solution,

occasionally opening eyelids, until no evidence of chemical remains. Remove contact lenses after a few minutes and rinse

again. Get medical attention immediately.

Ingestion The product may cause gastrointestinal tract irritation. Immediately

> rinse mouth and drink milk or water. Do not induce vomiting. If vomiting does occur, rinse mouth and drink fluids again. Call a

doctor or get medical attention.

4.2. Most important symptoms and

effects, both acute and delayed

Primarily irritation.

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

treatment needed

Immediate medical attention is required in case of ingestion or eye

contact.

The irritating effects of this product can be treated as usual against Note to physician

effects of acids or acid fumes. Possible mucosal damage may

contraindicate the use of gastric lavage.

SECTION 5: FIREFIGHTING 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, phosphorus pentoxide and nitrogen oxides.

5.3. Advice for firefighters Use water spray to keep fire-exposed containers cool. Approach

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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. It is advisable for firemen to avoid direct contact with the product such as splashing.

♣ 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 (not metal) for the collection of spills should be available.

In case of large spill (involving 10 tonnes of the product or more):

- 1. Use personal protection equipment; see section 8
- 2. Call emergency telephone no.; see section 1
- 3. Alert authorities.

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

Stop the source of the spill immediately if safe to do so. Avoid and reduce mist formation as much as possible. Personal exposure by splashing must be avoided.

6.2. Environmental precautions

Contain the spill to prevent any further contamination of surface, soil or water. Wash waters must be prevented from entering surface water drains. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.

6.3. Methods and materials for containment and cleaning up

It is recommended to consider possibilities to prevent damaging effects of spills, such as bunding or capping. See GHS (Annex 4, Section 6).

If appropriate, surface water drains should be covered. Minor spills on the floor or other impervious surface should be absorbed onto an absorptive material such as universal binder, hydrated lime, attapulgite, bentonite or other absorbent clays. Collect the contaminated absorbent in suitable containers. Clean area with detergent and rinse with 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 8.2. for personal protection. See section 13 for disposal.

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♣ 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. Otherwise it is recommended to handle the material 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.

Avoid contact with eyes, skin or clothing. Avoid breathing vapour or spray mist. Wash thoroughly after handling. Remove contaminated clothing immediately. Then wash thoroughly and put on clean clothing.

The product or its spray solutions should be stored in stainless steel, aluminium, fiberglass, plastic or plastic-lined containers only. See subsection 10.5.

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 at normal storage temperatures.

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. 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) This 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. To our knowledge, personal exposure limits have not been Control parameters

established for glyphosate or any other component in this product. However, exposure limits defined by local regulations may exist

and must be observed.

Glyphosate free acid

DNEL, systemic 0.2 mg/kg bw/day 0.028 mg/lPNEC, aquatic

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

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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

The product is not likely to present an airborne exposure concern during normal handling, but in the event of a discharge of the material which produces a heavy vapour or mist, workers should put on officially approved face mask or respiratory protection equipment with a universal filter type including particle filter.



Protective gloves

Wear heavy duty, natural rubber gloves. The breakthrough times of these gloves for glyphosate are unknown, but it is expected that they will give adequate protection. It is recommended to limit the work to be done manually.



Eye protection

Wear goggles, safety glasses or face shield. It is recommended to have an eye wash fountain immediately available in the work area 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 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 Light yellow liquid

Odour Practically odourless to slight amine-like odour

Odour threshold Not determined

1% dilution in water: 5.14 at 20°C

Melting point/freezing point Below 0°C Initial boiling point and boiling range 113°C

Upper/lower flammability or

explosive limits Not determined

Density: 1.165 g/ml at 20°C

dichloromethane 0.184 g/l methanol 15.88 g/l

Solubility of glyphosate free acid at 20°C in water: 10.5 g/l

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Partition coefficient n-octanol/water Glyphosate free acid: $log K_{ow} = -3.3$

Autoignition temperature Not determined Decomposition temperature Not determined

9.2. **Other information**

Miscibility The product is miscible with water.

♣ SECTION 10: STABILITY AND REACTIVITY

10.1. **Reactivity** See below.

10.2. **Chemical stability** Stable at ambient temperatures.

10.3. **Possibility of hazardous reactions** The product can react with caustic (basic) materials in an acid-base

chemical neutralisation reaction which may be hazardous because

of heat release.

10.4. **Conditions to avoid** Heating of the product will produce harmful and irritant vapours.

unlined steel containers or spray tanks. Stainless steel may be used. The product or its spray solutions may react with such containers to produce hydrogen gas which could flash or explode if ignited.

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

♣ SECTION 11: TOXICOLOGICAL INFORMATION

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

Product

Acute toxicity The product is practically non-toxic. * However, it should always

be treated with the usual care of handling chemicals.

No significant adverse health effects are expected to develop if only small amounts (less than a mouthful) are swallowed. Ingestion of similar formulations has been reported to produce gastrointestinal discomfort with nausea, vomiting and diarrhoea. Ingestion of large quantities of a similar product has been reported to result in

hypotension and lung oedema.

The acute toxicity of the product is measured as:

Route(s) of entry - ingestion LD_{50} , oral, rat: > 5000 mg/kg (method FIFRA 81.01)

- skin LD_{50} , dermal, rat: > 2000 mg/kg (method FIFRA 81.02)

- inhalation LC_{50} , inhalation, rat: > 4.86 mg/l/4 h (method FIFRA 81.03)

(no signs of toxicity at this concentration)

Serious eye damage/irritation The product is moderately to severely irritating to eyes (method

FIFRA 81.04). *

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Respiratory or skin sensitisation	The product is not sensitising (method FIFRA 81.06). *
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 known 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 glyphosate: In long-term studies with glyphosate free acid, the first minor effects (body weight and liver weight changes) were noted in rats at exposure levels of 60 - 100 mg glyphosate/kg bw/day. No signs of toxicity were found at any level, including the highest exposure level of 4800 mg glyphosate/kg bw/day. *
Aspiration hazard	The product does not present an aspiration hazard. *
Symptoms and effects, acute and delayed	Primarily irritation.
Glyphosate isopropylamine salt Acute toxicity	The substance is practically non-toxic. *
The acute toxicity of the substance is r	neasured as:
Route(s) of entry - ingestion	LD_{50} , oral, rat: $> 2000 \text{ mg/kg}$ (method FIFRA 81.01)
- skin	LD_{50} , dermal, rat: > 4000 mg/kg (method FIFRA 81.02)
- inhalation	LC_{50} , inhalation, rat: > 4.72 mg/l/4 h (method FIFRA 81.03) (no signs of toxicity at this concentration)
Skin corrosion/irritation	Not irritating to skin (method FIFRA 81.05). *
Serious eye damage/irritation	Not irritating to eyes (method FIFRA 81.04). *
Respiratory or skin sensitisation	Not sensitising (method FIFRA 81.06). *
Glyphosate Toxicokinetics, metabolism and distribution	After oral intake, glyphosate is rapidly absorbed but only to a limited extent (approx. 30%). Metabolism is very limited and excretion is rapid and nearly complete. Distribution is generally low with residues occurring in all tissues. There is no evidence of accumulation.
Acute toxicity	The substance is practically non-toxic. * The acute toxicity of the substance is measured as:
Route(s) of entry - ingestion	LD_{50} , oral, rat: > 5000 mg/kg (method OECD 401)
- skin	LD_{50} , dermal, rat: > 2000 mg/kg (method OECD 402)

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	- inhalation	LC_{50} , inhalation, rat: > 5 mg/l/4 h (method OECD 403) (no signs of toxicity at this concentration)
Skin corrosion/irritation		Not irritating to skin (method FIFRA 81.05). *
Serious eye damage/	irritation	Irritating to eyes (method FIFRA 81.04).
Respiratory or skin s	ensitisation	Not sensitising (method OECD 406). No allergic effects on humans have been reported. *
Carcinogenicity		No indications of carcinogenic effects were found in 8 studies on glyphosate and no study on glyphosate itself has shown possible carcinogenic effects.
Tallow alkylamine ethoxylate Acute toxicity		The substance is harmful by ingestion. The acute toxicity of the substance is measured as:
Route(s) of entry	- ingestion	LD ₅₀ , oral, rat: 1569 mg/kg (method OECD 401)
	- skin	LD ₅₀ , dermal, rat: not available
	- inhalation	LC ₅₀ , inhalation, rat: not available
Skin corrosion/irritation		Causes skin irritation.
Serious eye damage/irritation		Causes serious eye irritation.
STOT – single exposure		May cause irritation of mucous membranes.
STOT – repeated exposure		May cause damage on prolonged or repeated exposure.

♣ SECTION 12: ECOLOGICAL INFORMATION

12.1.	Toxicity	The product is a herbicide	and therefore expected to be harmful to
		all green plants. The produ	ct is harmful to fish and aquatic

all green plants. The product is harmful to fish and aquatic invertebrates. It is considered as less harmful to birds and soil

micro- and macroorganisms.

The ecotoxicity of the product is measured as:			
- Fish	Rainbow trout (Salmo gairdneri)	96 h-LC ₅₀ : 18.6 mg/l (static) 21-day NOEC: 0.43 - 0.81 mg/l	
	Bluegill sunfish (Lepomis macrochirus)	96 h-LC ₅₀ : 11.9 mg/l (static)	
- Invertebrates	Daphnids (Daphnia magna)	48 h-EC ₅₀ : 21.6 mg/l 21-day NOEC: 1.5 mg/l	
- Algae	Green algae (Scenedesmus subspicatus)	•	
	Diatoms (Skeletonema costatum)(Navicula pelliculosa)	50	
- Plants	Duckweed (Lemna gibba)	7-day EC ₅₀ : 27 mg/l	
- Earthworms	Eisenia foetida foetida	14 -day LC_{50} : > $1000 \text{ mg/kg dry soil}$	
- Birds	Japanese quail (Coturnix japonica)	LD_{50} : 1900 mg/kg 5-day dietary LD_{50} : > 5000 ppm in feed	

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- Bees	Honey bees (Apis med	Ulifera)
- Bacteria	Activated sludge	IC_{50} : > 100 mg/kg
Persistence and	l degradability	Glyphosate is not readily biodegradable. It undergoes slow 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 is mainly microbiological and aerobic, but anaerobic degradation does also occur.
		Primary degradation half-lives in the environment vary much with circumstances, but are usually around 3 - 30 days in aerobic soil and water.
		The product contains minor amounts of not readily biodegradable ingredients, which may not be degradable in a waste water treatment plant.
Bioaccumulativ	e potential	See section 9 for octanol-water partition coefficient.

Glyphosate is not expected to bioaccumulate. In several studies on bioaccumulation of glyphosate, both in marine and freshwater systems, only low bioaccumulation factors were found.

Mobility in soil In the environment **glyphosate** is not mobile, but is rapidly 12.4. deactivated by adsorption to clay particles. Glyphosate binds strongly to soil.

12.5. Results of PBT and vPvB assessment

12.2.

12.3.

None of the ingredients meet 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

Waste treatment methods Remaining quantities of the material and empty but unclean packaging should be regarded as hazardous waste.

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

Disposal of product

According to the Waste Framework Directive (2008/98/EC), possibilities for reuse or reprocessing should first be considered. If this is not feasible, the material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems. Contact appropriate state agency when considering a land spreading disposal option.

Disposal of packaging

It is recommended to consider possible ways of disposal in the following order:

1. Reuse or recycling should first be considered. If offered for

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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

14.2. **UN proper shipping name** Environmentally hazardous substance, liquid, n.o.s. (glyphosate

isopropylamine salt)

14.3. Transport hazard class(es) 9

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

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.

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.

SECTION 16: OTHER INFORMATION

Relevant changes in the safety data sheet

Minor corrections only.

Dir. Directive

DNEL Derived No Effect Level EC European Community EC₅₀ 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, Fifth revised edition 2013

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	IBC IC ₅₀ ISO IUPAC LC ₅₀ LD ₅₀ MARPOI NOEC n.o.s. OECD PBT PNEC Reg. SL STOT vPvB WHO	International Bulk Chemical code 50% Inhibition Concentration International Organisation for Standardization International Union of Pure and Applied Chemistry 50% Lethal Concentration 50% Lethal Dose Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution No Observed Effect Concentration Not otherwise specified Organisation for Economic Co-operation and Development Persistent, Bioaccumulative, Toxic Predicted No Effect Concentration Regulation Soluble concentrate Specific Target Organ Toxicity very Persistent, very Bioaccumulative World Health Organisation
References	Data measured on the product are unpublished company data. Data on ingredients are from published literature data and can be found several places.	
Method for classification	Test data	
Used hazard statements	H302 H315 H318 H319 H400 H410 H411 EUH401	Harmful if swallowed. Causes skin irritation. Causes serious eye damage. Causes serious eye irritation. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects. Toxic to aquatic life with long lasting effects. To avoid risks to human health and the environment, comply with the instructions of use.
Advice on training		rial should only be used by persons who are made aware ardous properties and have been instructed in the required cautions.

The information provided in this safety data sheet is believed to be accurate and reliable, but uses of the product vary and situations unforeseen by Cheminova A/S may exist. The user has to check the validity of the information under local circumstances.

Prepared by: Cheminova A/S / GHB