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CVR No. DK 12 76 00 43

SAFETY DATA SHEET

4521, GLYPHOSATE 360 g/l SL

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** ..... **4521, GLYPHOSATE 360 g/l SL**

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, a subsidiary of FMC Corporation
Thyborønvej 78
DK-7673 Harboøre
Denmark
SDS.Ronland@fmc.com

1.4. **Emergency telephone number**

Company ..... +45 97 83 53 53 (24 h; for emergencies only)

Medical emergencies:

Austria: +43 1 406 43 43
Belgium: +32 70 245 245
Bulgaria: +359 2 9154 409
Cyprus: 1401
Czech Republic: +420 224 919 293
+420 224 915 402
Denmark: +45 82 12 12 12
France: +33 (0) 1 45 42 59 59
Finland: +358 9 471 977
Greece: 30 210 77 93 777
Hungary: +36 80 20 11 99
Ireland (Republic): +353 1 809 2166
Italy: +39 02 6610 1029
Lithuania: +370 523 62052
+370 687 53378
Luxembourg: +352 8002 5500
Netherlands: +31 30 274 88 88
Norway: +47 22 591300
Poland: +48 22 619 66 54
+48 22 619 08 97
Portugal: 808 250 143 (in Portugal only)
+351 21 330 3284
Romania: +40 21318 3606
Slovakia: +421 2 54 77 4 166
Slovenia: +386 41 650 500
South Africa: +27 83 123 3911 (Bateleur Emergency Response Co.)
Spain: +34 91 562 04 20
Sweden: +46 08-331231
112
Switzerland: 145
Turkey: 114
United Kingdom: 111
U.S.A. & Canada: +1 800 / 331-3148 (ProPharma)
All other countries: +1 651 / 632-6793 (ProPharma - Collect)

SECTION 2: HAZARDS IDENTIFICATION

2.1. **Classification of the substance or mixture** ..... None

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WHO classification ..... Class U (Unlikely to present acute hazard in normal use)

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

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 as amended

Product identifier ..... 4521, Glyphosate 360 g/l SL

Hazard pictograms ..... None
Signal word ..... None
Hazard statements ..... None
Precautionary statements ..... None

Supplementary hazard statements
EUH210 ..... Safety data sheet available on request.
EUH401 ..... To avoid risks to human health and the environment, comply with the instructions of use.

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

♣ SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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

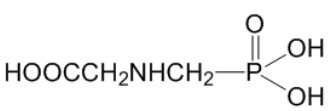
3.2. **Mixtures** ..... See section 16 for full text of hazard statements.

Active ingredient ..... **Glyphosate, in the form of its isopropylamine salt**

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)-
CAS no. 1071-83-6
IUPAC name(s) ..... N-(Phosphonomethyl)glycine
ISO name/EU name ..... Glyphosate
EC no. (EINECS no.) 213-997-4
EU index no. 607-315-00-8
Classification of the ingredient ..... Eye damage: Category 1 (H318)
Hazards to the aquatic environment, chronic: Category 2 (H411)

Structural formula .....



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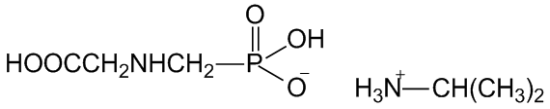
Glyphosate isopropylamine salt Content: 42% by weight
CAS name ..... Glycine, N-(phosphonomethyl)-, compd. with 2-propanamine (1:1)
CAS no. 38641-94-0
IUPAC name ..... –
EU name ..... N-(phosphonomethyl)glycine, compound with 2-propylamine (1:1)
Common name ..... Glyphosate isopropylamine salt
Other name(s) ..... Glyphosate-isopropylammonium
EC no. (EINECS no.) 254-056-8
EU index no. 015-184-00-8
Classification of the ingredient ..... Hazards to the aquatic environment, chronic: Category 2 (H411)
Structural formula .....



Reportable ingredients	Content (% w/w)	CAS no.	EC no. (EINECS no.)	Classification
Poly(oxy-1,2-ethanediyl), α-phosphono-ω-butoxy-, isopropylamine salt	max. 3	431040-31-2	None	Skin Corr. 1C (H314) Eye Dam. 1 (H318)
2-(2-(2-Butoxyethoxy)ethoxy)ethanol	max. 1	143-22-6	205-592-6	Eye Dam. 1 (H318)
Alcohols, C8-10 (even numbered), ethoxylated	max. 1	71060-57-6	None	Acute Tox. 4 (H302) Eye Dam. 1 (H318)

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 ..... 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.

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4.3. **Indication of any immediate medical attention and special treatment needed** ..... Immediate medical attention is required in case of eye contact.

Note to physician ..... The irritating effects of this product can be treated as usual against effects of acids or acid fumes. Probable mucosal damage may contraindicate the use of gastric lavage.

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, phosphorus pentoxide and nitrogen oxides

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 (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).

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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, bentonite, attapulgite 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.

♣ 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.

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 under normal conditions of warehouse storage.

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Store 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. **Control parameters** ..... To our knowledge, personal exposure limits have not been established for glyphosate or any other component in this product. However, personal exposure limits defined by local regulations may exist and must be observed.

Glyphosate free acid
DNEL, systemic ..... 0.2 mg/kg bw/day
PNEC, aquatic ..... 0.028 mg/l

8.2. **Exposure controls** ..... When used in a closed system, personal protection equipment will not be required. The following is meant for other situations, when the use of a closed system is not possible, or when it is necessary to open the system. Consider the need to render equipment or piping systems non-hazardous before opening.

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 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 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 safety glasses, goggles or face shield. 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

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material or coveralls of polyethylene (PE) will be sufficient. Coveralls of PE must be discarded after use if contaminated. In cases of excessive or prolonged exposure, coveralls of barrier laminate may be required.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. **Information on physical and chemical properties**

Appearance	Yellow liquid
Odour	Slight amine-like odour
Odour threshold	Not determined
pH	1% solution in water: 5.1 at 25°C
Melting point/freezing point	Below 0°C
Initial boiling point and boiling range	Above 100°C
Flash point	Above 100°C
Evaporation rate	Not determined
Flammability (solid/gas)	Not applicable (liquid)
Upper/lower flammability or explosive limits	Not determined
Vapour pressure	For glyphosate free acid: 1.31 x 10^{-5} Pa at 25°C
Vapour density	Not determined
Relative density	Not determined Density: 1.169 g/cm^3 at 20°C
Solubility(ies)	Solubility of glyphosate isopropylamine salt at 20°C in dichloromethane 0.184 g/l methanol 15.88 g/l Solubility of glyphosate free acid in water: 10.5 g/l at 20°C.
Partition coefficient n-octanol/water	Glyphosate free acid: log K_{ow} = -3.3
Autoignition temperature	Not determined
Decomposition temperature	Not determined
Viscosity	24.6 mPa.s at 25°C, 11.9 mPa.s at 45°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**	To our knowledge, 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 produce harmful and irritant vapours.
10.5.	**Materials to avoid**	Do not store or mix this product in galvanised or unlined steel

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containers. Stainless steel may be used. The product 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 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, as measured on a similar product, is:

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)
	- inhalation	LC_{50}, inhalation, rat: > 4.72 mg/l/4 h (method OECD 403) no signs of toxicity at this concentration

Skin corrosion/irritation ..... Not irritating to skin (measured on a similar product; method OECD 404). *

Serious eye damage/irritation ..... Not irritating to eyes (measured on a similar product; method OECD 405). *

Respiratory or skin sensitisation ... Not sensitising (measured on a similar product; method OECD 406). *

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

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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 measured as:

Route(s) of entry	- ingestion	LD_{50}, oral, rat: > 2000 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)
	- 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 sensitisation ... 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.

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SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** ..... The product is a herbicide and therefore expected to be toxic to all green plants. It does not meet the criteria for being harmful to aquatic plants. The product is not considered as harmful to fish, aquatic invertebrates, birds and soil micro- and macroorganisms.

The ecotoxicity of the product is measured as:

- Fish	Rainbow trout (*Oncorhynchus mykiss*)	96 h-LC_{50}: > 1000 mg/l
- Invertebrates	Daphnids (*Daphnia magna*)	48 h-EC_{50}: > 1000 mg/l
- Algae	Green algae (*Pseudokirchneriella subcapitata*)	72-h IC_{50}: 189 mg/l

The following has been measured on a similar but more concentrated product:

- Plants	Duckweed (*Lemna gibba*)	7-day NOEC: 3.19 mg/l
- Birds	Japanese quail (*Coturnix coturnix japonica*)	LD_{50}: > 3340 mg/kg
- Earthworms	*Eisenia foetida*	14-day LD_{50}: > 10000 mg/kg soil
- Bees	Honeybee (*Apis mellifera* africanised)	LD_{50}, acute oral: > 100 µg/bee

12.2. **Persistence and 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.

12.3. **Bioaccumulative 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.

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

12.5. **Results of PBT and vPvB assessment** ..... The substance does not meet the criteria for being PBT or vPvB.

12.6. **Other adverse effects** ..... Other relevant hazardous effects in the environment are not known.

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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.

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

Disposal of packaging .....

It is recommended to consider possible ways of disposal in the following order:
1. Reuse or recycling should first be considered. Reuse is prohibited except by the authorisation holder. If offered for recycling, containers must be emptied and triply rinsed (or equivalent). Do not discharge rinsing water to sewer systems.
2. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.
3. Delivery of the packaging to a licensed service for disposal of hazardous waste.
4. Disposal in a landfill or burning in open air should only occur as a last resort. For disposal in a landfill, containers should be emptied completely, rinsed and punctured to make them unusable for other purposes. If burned, stay out of smoke.

SECTION 14: TRANSPORT INFORMATION

ADR/RID/IMDG/IATA/ICAO classification

14.1. **UN number** ..... Not classified as hazardous material for transport

14.2. **UN proper shipping name** ..... Not applicable

14.3. **Transport hazard class(es)** ..... Not applicable

14.4. **Packing group** ..... Not applicable

14.5. **Environmental hazards** ..... The product may be harmful in the environment.

14.6. **Special precautions for user** ..... Avoid any unnecessary contact with the product. Misuse can result in damage to health. Do not discharge to the environment.

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14.7. **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code** ..... The product is not transported in bulk by ship.

SECTION 15: REGULATORY INFORMATION

15.1. **Safety, health and environmental regulations/legislation specific for the substance or mixture**

To our knowledge, no specific regulations apply.

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.

List of abbreviations .....

CAS	Chemical Abstracts Service
Dir.	Directive
DNEL	Derived No Effect Level
EC	European Community
EC_{50}	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
IBC	International Bulk Chemical code
IC_{50}	50% Inhibition Concentration
ISO	International Organisation for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LC_{50}	50% Lethal Concentration
LD_{50}	50% Lethal Dose
MARPOL	Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
PBT	Persistent, Bioaccumulative, Toxic
PNEC	Predicted No Effect Concentration
Reg.	Regulation
SL	Soluble concentrate
STOT	Specific Target Organ Toxicity
vPvB	very Persistent, very Bioaccumulative
WHO	World Health Organisation

References ..... Data measured on this and a similar formulation and acute toxicity data measured on the active ingredient are unpublished company data. Other data for glyphosate are taken from the EU evaluation of the substance.

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Method for classification	Test data	
Used hazard statements	H302	Harmful if swallowed.
	H314	Causes severe skin burns and eye damage.
	H318	Causes serious eye damage.
	H411	Toxic to aquatic life with long lasting effects.
	EUH210	Safety data sheet available on request.
	EUH401	To avoid risks to human health and the environment, comply with the instructions of use.
Advice on training	This material should only be used by persons who are made aware of its hazardous properties and have been instructed in the required safety precautions.	

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

Prepared by: FMC Corporation / Cheminova A/S / GHB