

Prevention	P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/... P273 Avoid release to the environment.
Response	P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P317 Get medical help. P391 Collect spillage.
Storage	none
Disposal	P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Glyphosate	Glyphosate	1071-83-6	213-997-4	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap.

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting.

4.2 Most important symptoms/effects, acute and delayed

SYMPTOMS: Symptoms of exposure to this compound include irritation of the skin, gastrointestinal tract and respiratory tract, convulsions and coma. It may also cause enhanced breathing. ACUTE/CHRONIC HAZARDS: This compound is an irritant of the skin, respiratory tract and gastrointestinal tract. When heated to decomposition it emits very toxic fumes of nitrogen oxides and phosphorus oxides. (NTP, 1992)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Glyphosate (Roundup) and Related Compounds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

To fight fire use/ powder, alcohol-resistant foam, water spray, carbon dioxide.

5.2 Specific hazards arising from the chemical

Flash point data for this chemical are not available; however, it is probably combustible. (NTP, 1992)

5.3 Special protective actions for fire-fighters

Use water spray, powder, alcohol-resistant foam, carbon dioxide.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered plastic containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered plastic containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Sweep spilled substance into plastic containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames, NO sparks and NO smoking. Prevent build-up of electrostatic charges (e.g., by grounding). Closed system, dust explosion-proof electrical equipment and lighting. Prevent deposition of dust. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Well closed. Do NOT store or transport in containers made from galvanized steel or unlined steel. Store in an area without drain or sewer access. Safe Storage of Pesticides. Always store pesticides in their original containers, complete with labels that list ingredients, directions for use, and first aid steps in case of accidental poisoning. Never store pesticides in cabinets with or near food, animal feed, or medical supplies. Do not store pesticides in places where flooding is possible or in places where they might spill or leak into wells, drains, ground water, or surface water.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear safety goggles.

Skin protection

Protective gloves.

Respiratory protection

Avoid inhalation of dust and mist.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	PHYSICAL DESCRIPTION: Odorless white powder. Decomposition begins at approximately 419°F (darkens). pH (1% solution in water) 2.5. (NTP, 1992)
Colour	White crystals
Odour	Odorless
Melting point/freezing point	230°C
Boiling point or initial boiling point and boiling range	465.8°C at 760 mmHg
Flammability	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit/flammability limit	no data available
Flash point	235.5°C
Auto-ignition temperature	no data available
Decomposition temperature	<234°C
pH	no data available
Kinematic viscosity	no data available
Solubility	5 to 10 mg/mL at 64° F (NTP, 1992)
Partition coefficient n-octanol/water	-1
Vapour pressure	1.94e-07 mm Hg at 113° F (NTP, 1992)
Density and/or relative density	1.74
Relative vapour density	no data available
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on heating. This produces toxic fumes including nitrogen oxides and phosphorus oxides. Attacks iron and galvanized steel.

10.2 Chemical stability

Negligible volatility

10.3 Possibility of hazardous reactions

Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc. GLYPHOSATE

may react with galvanized steel or unlined steel (except stainless steel) containers to produce hydrogen gas which may form a highly combustible or explosive gas mixture. It can react with caustic (basic) materials to liberate heat. It is corrosive to iron. (NTP, 1992)

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Incompatible materials: Strong oxidizing agents, metals, bases.

10.6 Hazardous decomposition products

When heated to decomposition it emits very toxic fumes of /nitrogen and phosphorus oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Goat oral 3530 mg/kg
- Inhalation: LC50 Rat inhalation >4.98 mg/L air/4 hr
- Dermal: LD50 Rabbit percutaneous >5000 mg/kg

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Classification - D; not classifiable as to human carcinogenicity. Basis - Inadequate evidence for oncogenicity in animals. Glyphosate was originally classified as C, possible human carcinogen, on the basis of increased incidence of renal tumors in mice. Following independent review of the slides the classification was changed to D on the basis of a lack of statistical significance and uncertainty as to a treatment-related effect.

Reproductive toxicity

no data available

STOT-single exposure

The substance is severely irritating to the eyes. The substance is mildly irritating to the skin.

STOT-repeated exposure

no data available

Aspiration hazard

A harmful concentration of airborne particles can be reached quickly on spraying.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: /Oncorhynchus mykiss/ (Rainbow trout) weight 0.8 g; Conditions: static bioassay without aeration, 12 deg C, pH 7.2-7.5, water hardness 40-

- 50 mg/L as calcium carbonate and alkalinity of 30-35 mg/L Concentration: 130 mg/L for 96 hr (95% confidence interval: 108-156 mg/L) /Technical material, 96.7%
- Toxicity to daphnia and other aquatic invertebrates: EC50; Species: Daphnia magna (Water Flea) age <24 hr; Conditions: freshwater, static; Concentration: >22000 ug/L for 48 hr; Effect: intoxication, immobilization /80% purity
 - Toxicity to algae: EC50; Species: Microcystis aeruginosa (Blue-Green Algae) Exponential Growth Phase; Conditions: freshwater, static, 22 deg C; Concentration: 251400 ug/L for 21 days; Effect: decreased population growth rate /formulation
 - Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: When glyphosate was incubated in Williams silt loam soil (pH 6.4, 1.9% organic matter), 19% degradation occurred in 9 days. No degradation was noted in sterilized soil(1). In shake-flask metabolism studies, glyphosate was rapidly and completely biodegraded in the presence of soil microorganisms under both aerobic and anaerobic conditions(2). After 28 days under aerobic conditions, 45-55% of the glyphosate was mineralized using Ray silt loam soil, Lintonia sandy loam soil, and Drummer silty clay loam soil. Norfolk sandy loam mineralized glyphosate at a much slower, but still significant, rate. In greenhouse experiments, the half-lives of glyphosate in Ray, Drummer and Norfolk soil was 3, 27, and 130 days, respectively(2). The biodegradation half-life of glyphosate in a Kickapoo sandy loam and Dupo silt loam soil were 1.85 and 2.06 days, respectively, under aerobic conditions. The major degradation product observed was aminomethyl phosphonic acid. The aerobic and anaerobic biodegradation half-life of glyphosate in a flooded silty clay loam sediment was 7 and 8.1 days, respectively(3).

12.3 Bioaccumulative potential

In controlled laboratory studies using glyphosate at levels 3 to 4 times the recommended application rates, BCF values in fish tissue 10-14 days post application ranged from 0.2 to 0.3(1). A BCF value of 0.52 (whole body) was measured in bluegill (*Lepomis macrochirus*) exposed for 28 days(2). BCF values of 0.38 for edible tissues and 0.63 for non-edible tissues have been reported(3). According to a classification scheme(4), these BCF data suggest that bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

When applied to clay loam or muck soil at an application rate of 56 kg/ha, glyphosate was rapidly inactivated. This inactivation was probably the result of reversible adsorption to clay and organic matter. Iron and aluminum clays and organic matter adsorbed more glyphosate than sodium and calcium clays and was readily bound to kaolinite, illite, bentonite, charcoal and muck but not to ethyl cellulose. (14)C-Labeled glyphosate was degraded in soil and (14)CO₂ was released.

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

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.

Contaminated 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

ADR/RID: Not dangerous IMDG: Not dangerous goods. IATA: Not dangerous goods.

goods. (For reference only, please check.) (For reference only, please check.) (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: Not dangerous goods. (For reference only, please check.) IMDG: Not dangerous goods. (For reference only, please check.) IATA: Not dangerous goods. (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: Not dangerous goods. (For reference only, please check.) IMDG: Not dangerous goods. (For reference only, please check.) IATA: Not dangerous goods. (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: Not dangerous goods. (For reference only, please check.) IMDG: Not dangerous goods. (For reference only, please check.) IATA: Not dangerous goods. (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: Yes IMDG: Yes IATA: Yes

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Glyphosate	Glyphosate	1071-83-6	213-997-4
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Not Listed.
China Catalog of Hazardous chemicals 2015			Not Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019
Revision Date July 15, 2019

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods

- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Other Information

Sodium, potassium and amine salts are readily soluble in water. Carrier solvents used in commercial formulations may change physical and toxicological properties.

Any questions regarding this SDS, Please send your inquiry to sds@xixisys.com

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