

**MONSANTO COMPANY**  
Material Safety Data Sheet  
Commercial Product

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## 1. PRODUCT AND COMPANY IDENTIFICATION

**Product name**

**Roundup Original® Herbicide**

**EPA Reg. No.**

524-445

**Product use**

Herbicide

**Chemical name**

Not applicable.

**Synonyms**

None.

**Company**

MONSANTO COMPANY, 800 N. Lindbergh Blvd., St. Louis, MO, 63167

**Telephone:** 800-332-3111, **Fax:** 314-694-5557

**Emergency numbers**

FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT Call CHEMTREC - Day or Night: 1-800-424-9300 toll free in the continental U.S., Puerto Rico, Canada, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted).

FOR MEDICAL EMERGENCY - Day or Night: +1 (314) 694-4000 (collect calls accepted).

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## 2. COMPOSITION/INFORMATION ON INGREDIENTS

**Active ingredient**

Isopropylamine salt of N-(phosphonomethyl)glycine; {Isopropylamine salt of glyphosate }

**Composition**

COMPONENT	CAS No.	% by weight (approximate)
Isopropylamine salt of glyphosate	38641-94-0	41
Other ingredients		59

The specific chemical identity is being withheld because it is trade secret information of Monsanto Company.

**OSHA Status**

This product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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## 3. HAZARDS IDENTIFICATION

**Emergency overview**

**Appearance and odour (colour/form/odour):** Yellow - Amber / Liquid / Slight

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY

HARMFUL IF SWALLOWED

HARMFUL IF INHALED

**Potential health effects**

**Likely routes of exposure**

Skin contact, eye contact

**Eye contact, short term**

May cause temporary eye irritation.

**Skin contact, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

**Inhalation, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

Refer to section 11 for toxicological and section 12 for environmental information.

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## 4. FIRST AID MEASURES

**Eye contact**

Immediately flush with plenty of water.

Continue for at least 15 minutes.

If easy to do, remove contact lenses.

If there are persistent symptoms, obtain medical advice.

**Skin contact**

Wash affected skin with plenty of water.

Wash clothes and clean shoes before re-use.

Take off contaminated clothing, wristwatch, jewellery.

**Inhalation**

Remove to fresh air.

**Ingestion**

Immediately offer water to drink.

Do NOT induce vomiting unless directed by medical personnel.

If symptoms occur, get medical attention.

**Advice to doctors**

This product is not an inhibitor of cholinesterase.

**Antidote**

Treatment with atropine and oximes is not indicated.

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## 5. FIRE-FIGHTING MEASURES

**Flash point**

Does not flash.

**Extinguishing media**

Recommended: Water, dry chemical, carbon dioxide (CO<sub>2</sub>), foam

**Unusual fire and explosion hazards**

None.

Environmental precautions: see section 6.

**Hazardous products of combustion**

Carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), phosphorus oxides (P<sub>x</sub>O<sub>y</sub>)

**Fire fighting equipment**

Self-contained breathing apparatus.

Equipment should be thoroughly decontaminated after use.

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## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions

Use personal protection recommended in section 8.

### Environmental precautions

SMALL QUANTITIES:

Low environmental hazard.

LARGE QUANTITIES:

Minimise spread.

Keep out of drains, sewers, ditches and water ways.

### Methods for cleaning up

SMALL QUANTITIES:

Flush spill area with water.

LARGE QUANTITIES:

Absorb in earth, sand or absorbent material.

Dig up heavily contaminated soil.

Collect in containers for disposal.

Refer to section 7 for types of containers.

Flush residues with small quantities of water.

Minimise use of water to prevent environmental contamination.

Refer to section 13 for disposal of spilled material.

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## 7. HANDLING AND STORAGE

Good industrial practice in housekeeping and personal hygiene should be followed.

### Handling

Avoid contact with skin and eyes.

When using do not eat, drink or smoke.

Wash hands thoroughly after handling or contact.

Thoroughly clean equipment after use.

Emptied containers retain vapour and product residue.

Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.

### Storage

Minimum storage temperature: 10 °F

Compatible materials for storage: stainless steel, aluminium, plastic, fibreglass, glass lining

Incompatible materials for storage: galvanised steel, unlined mild steel, see section 10.

Keep out of reach of children.

Keep away from food, drink and animal feed.

Keep only in the original container.

Partial crystallization may occur on prolonged storage below the minimum storage temperature.

If frozen, place in warm room and shake frequently to put back into solution.

Minimum shelf life: 5 years.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Airborne exposure limits

Components	Exposure Guidelines
Isopropylamine salt of glyphosate	No specific occupational exposure limit has been established.
Other ingredients	No specific occupational exposure limit has been established.

### Engineering controls

Have eye wash facilities immediately available at locations where eye contact can occur.

### Eye protection

If there is potential for contact:  
Wear chemical goggles.

### Skin protection

If repeated or prolonged contact:  
Wear chemical resistant gloves.

### Respiratory protection

No special requirement when used as recommended.

When recommended, consult manufacturer of personal protective equipment for the appropriate type of equipment for a given application.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

Colour/colour range:	Yellow - Amber
Form:	Liquid
Odour:	Slight
Flash point:	Does not flash.
Specific gravity:	1.1655 @ 20 °C / 15.6 °C
Vapour pressure:	22 mmHg 22 °C
pH:	4.4 - 5.0
Partition coefficient (log Pow):	< 0.000 (active ingredient)

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## 10. STABILITY AND REACTIVITY

### Stability

Stable under normal conditions of handling and storage.

### Hazardous decomposition

Thermal decomposition: Hazardous products of combustion: see section 5.

### Materials to avoid/Reactivity

Reacts with galvanised steel or unlined mild steel to produce hydrogen, a highly flammable gas that could explode.

### Hazardous polymerization

Does not occur.

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## 11. TOXICOLOGICAL INFORMATION

This section is intended for use by toxicologists and other health professionals.

Data obtained on product and components are summarized below.

### Acute oral toxicity

**Rat, LD50 (limit test):** > 5,000 mg/kg body weight

Other effects: breathing difficulty, decreased activity, soft stools

Practically non-toxic.

FIFRA category IV.

No mortality.

**Acute dermal toxicity**

**Rat, LD50 (limit test):** > 5,000 mg/kg body weight

Target organs/systems: none

Other effects: none

Practically non-toxic.

FIFRA category IV.

No mortality.

**Acute inhalation toxicity**

**Rat, LC50, 4 hours, aerosol:** 2.6 mg/L

Target organs/systems: none

Other effects: breathing difficulty, decreased activity, local effects

Practically non-toxic.

FIFRA category IV.

**Skin irritation**

**Rabbit, 6 animals, OECD 404 test:**

Days to heal: 1

Primary Irritation Index (PII): 0.4/8.0

Other effects: none

Essentially non irritating.

FIFRA category IV.

**Eye irritation**

**Rabbit, 6 animals, OECD 405 test:**

Days to heal: 10

Moderate irritation.

FIFRA category II.

**Skin sensitization**

**Guinea pig, Buehler test:**

Positive incidence: 0 %

**EXPERIENCE WITH HUMAN EXPOSURE**

**Ingestion, short term, case report(s):**

**Gastro-intestinal effects:** irritation, nausea/vomiting, diarrhoea

**Ingestion, short term, :**

**Respiratory effects:** increased fluid in lungs (lung/pulmonary oedema)

**Cardiovascular effects:** decreased blood pressure (hypotension)

**N-(phosphonomethyl)glycine; {glyphosate}**

**Mutagenicity**

**In vitro and in vivo mutagenicity test(s):**

Not mutagenic.

**Repeated dose toxicity**

**Rabbit, dermal, 21 days:**

NOAEL toxicity: > 5,000 mg/kg body weight/day

Target organs/systems: none

Other effects: none

**Rat, oral, 3 months:**

NOAEL toxicity: > 20,000 mg/kg diet

Target organs/systems: none

Other effects: none

**Chronic effects/carcinogenicity**

**Mouse, oral, 24 months:**

NOEL tumour: > 30,000 mg/kg diet

NOAEL toxicity: ~ 5,000 mg/kg diet

Tumours: none

Target organs/systems: liver  
Other effects: decrease of body weight gain, histopathologic effects

**Rat, oral, 24 months:**

NOEL tumour: > 20,000 mg/kg diet  
NOAEL toxicity: ~ 8,000 mg/kg diet

Tumours: none

Target organs/systems: eyes

Other effects: decrease of body weight gain, histopathologic effects

**Toxicity to reproduction/fertility**

**Rat, oral, 2 generations:**

NOAEL toxicity: 10,000 mg/kg diet

NOAEL reproduction: > 30,000 mg/kg diet

Target organs/systems in parents: none

Other effects in parents: decrease of body weight gain

Target organs/systems in pups: none

Other effects in pups: decrease of body weight gain

Effects on offspring only observed with maternal toxicity.

**Developmental toxicity/teratogenicity**

**Rat, oral, 6 - 19 days of gestation:**

NOAEL toxicity: 1,000 mg/kg body weight

NOAEL development: 1,000 mg/kg body weight

Other effects in mother animal: decrease of body weight gain, decrease of survival

Developmental effects: weight loss, post-implantation loss, delayed ossification

Effects on offspring only observed with maternal toxicity.

**Rabbit, oral, 6 - 27 days of gestation:**

NOAEL toxicity: 175 mg/kg body weight

NOAEL development: 175 mg/kg body weight

Target organs/systems in mother animal: none

Other effects in mother animal: decrease of survival

Developmental effects: none

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## 12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Data obtained on similar products are summarized below.

**Similar formulation**

**Aquatic toxicity, fish**

**Bluegill sunfish (*Lepomis macrochirus*):**

Acute toxicity, 96 hours, flowthrough, LC50: 5.8 mg/L

Moderately toxic.

**Rainbow trout (*Oncorhynchus mykiss*):**

Acute toxicity, 96 hours, flowthrough, LC50: 8.2 mg/L

Moderately toxic.

**Aquatic toxicity, invertebrates**

**Water flea (*Daphnia magna*):**

Acute toxicity, 48 hours, static, EC50: 11 mg/L

Slightly toxic.

**Aquatic toxicity, algae/aquatic plants**

**Green algae (*Selenastrum capricornutum*):**

Acute toxicity, 96 hours, static, EC50: 2.6 mg/L

Moderately toxic.

**Duckweed (*Lemna minor*):**

Acute toxicity, 7 days, static, EC50 (frond number): 6 mg/L

#### **Avian toxicity**

##### **Bobwhite quail (*Colinus virginianus*):**

Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet  
Practically non-toxic.

##### **Mallard duck (*Anas platyrhynchos*):**

Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet  
Practically non-toxic.

#### **Arthropod toxicity**

##### **Honey bee (*Apis mellifera*):**

Oral/contact, 48 hours, LD50: > 326 µg/bee  
Practically non-toxic.

#### **Soil organism toxicity, invertebrates**

##### **Earthworm (*Eisenia foetida*):**

Acute toxicity, 14 days, LC50: > 5,000 mg/kg dry soil  
Practically non-toxic.

#### **N-(phosphonomethyl)glycine; {glyphosate}**

#### **Bioaccumulation**

##### **Bluegill sunfish (*Lepomis macrochirus*):**

Whole fish: BCF: < 1  
No significant bioaccumulation is expected.

#### **Dissipation**

##### **Soil, field:**

Half life: 2 - 174 days  
Koc: 884 - 60,000 L/kg  
Adsorbs strongly to soil.

##### **Water, aerobic:**

Half life: < 7 days

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### **13. DISPOSAL CONSIDERATIONS**

#### **Product**

Dispose of as hazardous industrial waste.  
Recycle if appropriate facilities/equipment available.  
Burn in special, controlled high temperature incinerator.  
Keep out of drains, sewers, ditches and water ways.  
Follow all local/regional/national/international regulations.

#### **Container**

Triple or pressure rinse empty containers.  
Pour rinse water into spray tank.  
Store for collection by approved waste disposal service.  
Dispose of as hazardous industrial waste.  
Do NOT re-use containers.  
Follow all local/regional/national/international regulations.

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### **14. TRANSPORT INFORMATION**

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

Not hazardous under the applicable DOT, ICAO/IATA, IMO, TDG and Mexican regulations.

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### **15. REGULATORY INFORMATION**

**TSCA Inventory**

All components are on the US EPA's TSCA Inventory

**OSHA Hazardous Components**

Surfactant(s)

**SARA Title III Rules**

Section 311/312 Hazard Categories

Immediate

Section 302 Extremely Hazardous Substances

Not applicable.

Section 313 Toxic Chemical(s)

Not applicable.

**CERCLA Reportable quantity**

Not applicable.

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**16. OTHER INFORMATION**

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.

Follow all local/regional/national/international regulations.

Please consult supplier if further information is needed.

For more information refer to product label.

Please consult Monsanto if further information is needed.

In this document the British spelling was applied.

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	Health	Flammability	Instability	Additional Markings
NFPA	2	1	1	

0 = Minimal hazard, 1 = Slight hazard, 2 = Moderate hazard, 3 = Severe hazard, 4 = Extreme hazard

Full denomination of most frequently used acronyms. BCF (Bioconcentration Factor), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), EC50 (50% effect concentration), ED50 (50% effect dose), I.M. (intramuscular), I.P. (intraperitoneal), I.V. (intravenous), Koc (Soil adsorption coefficient), LC50 (50% lethality concentration), LD50 (50% lethality dose), LDLo (Lower limit of lethal dosage), LEL (Lower Explosion Limit), LOAEC (Lowest Observed Adverse Effect Concentration), LOAEL (Lowest Observed Adverse Effect Level), LOEC (Lowest Observed Effect Concentration), LOEL (Lowest Observed Effect Level), MEL (Maximum Exposure limit), MTD (Maximum Tolerated Dose), NOAEC (No Observed Adverse Effect Concentration), NOAEL (No Observed Adverse Effect Level), NOEC (No Observed Effect Concentration), NOEL (No Observed Effect Level), OEL (Occupational Exposure Limit), PEL (Permissible Exposure Limit), PII (Primary Irritation Index), Pow (Partition coefficient n-octanol/water), S.C. (subcutaneous), STEL (Short-Term Exposure Limit), TLV-C (Threshold Limit Value-Ceiling), TLV-TWA (Threshold Limit Value - Time Weighted Average), UEL (Upper Explosion Limit)

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