1. PRODUCT AND COMPANY IDENTIFICATION

Product name
Roundup Original MAX® Herbicide

EPA Reg. No.
524-539

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).

2. COMPOSITION/INFORMATION ON INGREDIENTS

Active ingredient
Potassium salt of N-(phosphonomethyl)glycine; {Potassium salt of glyphosate}

Composition

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS No.</th>
<th>% by weight (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium salt of glyphosate</td>
<td>70901-12-1</td>
<td>49</td>
</tr>
<tr>
<td>Other ingredients</td>
<td></td>
<td>51</td>
</tr>
</tbody>
</table>

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.

3. HAZARDS IDENTIFICATION

Emergency overview
Appearance and odour (colour/form/odour): Amber / Liquid / Odourless, Slight

CAUTION!
CAUSES MODERATE EYE IRRITATION

Potential health effects
Likely routes of exposure
Skin contact, eye contact, inhalation

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.

4. FIRST AID MEASURES

Eye contact
If in eyes, hold eye open and rinse slowly and gently for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing.

Skin contact
Take off contaminated clothing, wristwatch, jewellery.
Wash affected skin with plenty of water.
Continue for at least 15 minutes.

Inhalation
If inhaled, move person to fresh air. If person is not breathing, call emergency number or ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.

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.

5. FIRE-FIGHTING MEASURES

Flash point
Does not flash.

Extinguishing media
Recommended: Water, foam, dry chemical, carbon dioxide (CO2)

Unusual fire and explosion hazards
Minimise use of water to prevent environmental contamination.
Environmental precautions: see section 6.

Hazardous products of combustion
Carbon monoxide (CO), phosphorus oxides (PxOy), nitrogen oxides (NOx)

Fire fighting equipment
Self-contained breathing apparatus.
Equipment should be thoroughly decontaminated after use.

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.

7. HANDLING AND STORAGE

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

Handling
Avoid contact with eyes, skin and clothing.
When using do not eat, drink or smoke.
Wash hands thoroughly after handling or contact.
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.
Thoroughly clean equipment after use.
Refer to section 13 of the safety data sheet for disposal of rinse water.
Wash contaminated clothing before re-use.
Emptied containers retain vapour and product residue.
FOLLOW LABELLED WARNINGS EVEN AFTER CONTAINER IS EMTIED.

Storage
Compatible materials for storage: stainless steel, aluminium, fibreglass, plastic, 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.

8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Airborne exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Exposure Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium salt of glyphosate</td>
<td>No specific occupational exposure limit has been established.</td>
</tr>
<tr>
<td>Other ingredients</td>
<td>No specific occupational exposure limit has been established.</td>
</tr>
</tbody>
</table>

Engineering controls
No special requirement when used as recommended.

Eye protection
If there is significant potential for contact:
Wear chemical goggles.

**Skin protection**
- Wear chemical resistant gloves.
- If there is significant potential for contact:
  - Wear face shield.
  - Wear chemical resistant clothing/footwear.
- Applicators and other handlers must wear:
  - Wear long sleeved shirt, long pants and shoes with socks.
- Follow manufacturer's instructions for cleaning/maintaining Personal Protective Equipment.
- If no such instructions for washables, use detergent and hot water.

**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.

### 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.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour/colour range</td>
<td>Amber</td>
</tr>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>Odourless, Slight</td>
</tr>
<tr>
<td>Flash point</td>
<td>Does not flash.</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.36</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: Soluble</td>
</tr>
<tr>
<td>pH</td>
<td>4.4 - 4.8 10 g/l</td>
</tr>
<tr>
<td>Partition coefficient (log Pow)</td>
<td>-3.2 @ 25 °C (glyphosate)</td>
</tr>
</tbody>
</table>

### 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.

### 11. TOXICOLOGICAL INFORMATION

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

Data obtained on similar products and on components are summarized below.

**Similar formulation**

**Acute oral toxicity**
- Rat, LD50: > 5,000 mg/kg body weight
Practically non-toxic.
FIFRA category IV.

**Acute dermal toxicity**

Rat, LD50: > 5,000 mg/kg body weight
Practically non-toxic.
FIFRA category IV.

**Eye irritation**

Rabbit, 3 animals, OECD 405 test:
Days to heal: 7
Moderate irritation.
FIFRA category III.

**Acute inhalation toxicity**

Rat, LC50, 4 hours, aerosol:
Practically non-toxic.
FIFRA category IV.
No 4-hr LC50 at the maximum tested concentration.

**Skin sensitization**

Guinea pig, Buehler test:
Positive incidence: 0 %

**Similar formulation**

**Skin irritation**

Rabbit, 3 animals, OECD 404 test:
Days to heal: 7
Primary Irritation Index (PII): 2.3/8.0
Moderate irritation.
FIFRA category III.

**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

12. ECOLOGICAL INFORMATION

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

Data obtained on similar products and on components are summarized below.

Similar formulation

Aquatic toxicity, fish
Bluegill sunfish (Lepomis macrochirus):
- Acute toxicity, 96 hours, static, LC50: 5.2 mg/L
  Moderately toxic.
Common carp (Cyprinus carpio):
- Acute toxicity, 96 hours, static, LC50: 4.0 mg/L
  Moderately toxic.

Aquatic toxicity, invertebrates
Water flea (Daphnia magna):
- Acute toxicity, 48 hours, static, EC50: 8.0 mg/L
  Moderately toxic.

Similar formulation

Aquatic toxicity, algae/aquatic plants
Green algae (Selenastrum capricornutum):
- Acute toxicity, 72 hours, static, EC50: 0.46 mg/L
  Highly toxic.

Avian toxicity
Bobwhite quail (Colinus virginianus):
- Acute oral toxicity, single dose, LD50: > 2,250 mg/kg body weight
  Practically non-toxic.

Arthropod toxicity
Honey bee (Apis mellifera):
- Oral, 48 hours, LD50: > 281 µg/bee
  Practically non-toxic.
Honey bee (Apis mellifera):
Contact, 48 hours, LD50: > 273 µg/bee
Practically non-toxic.

Soil organism toxicity, invertebrates
Earthworm (Eisenia fetida):
Acute toxicity, 14 days, LC50: > 10,000 mg/kg dry soil
Practically non-toxic.

Soil organism toxicity, microorganisms
Nitrogen and carbon transformation test:
29.5 kg/ha, 28 days: Less than 25% effect on nitrogen or carbon transformation processes in soil.

N-(phosphonomethyl)glycine; (glyphosate)

Avian toxicity
Bobwhite quail (Colinus virginianus):
Dietary toxicity, 5 days, LC50: > 4,640 mg/kg diet
No more than slightly toxic.
Mallard duck (Anas platyrhynchos):
Dietary toxicity, 5 days, LC50: > 4,640 mg/kg diet
No more than slightly toxic.
Bobwhite quail (Colinus virginianus):
Acute oral toxicity, single dose, LD50: > 3,851 mg/kg body weight
Practically non-toxic.

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

13. DISPOSAL CONSIDERATIONS

Product
Keep out of drains, sewers, ditches and water ways.
Recycle if appropriate facilities/equipment available.
Burn in proper incinerator.
Follow all local/regional/national/international regulations.

Container
See the individual container label for disposal information.
Emptied containers retain vapour and product residue.
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.
Empty packaging completely.
Triple or pressure rinse empty containers.
Do NOT contaminate water when disposing of rinse waters.
Ensure packaging cannot be reused.
Do NOT re-use containers.
Store for collection by approved waste disposal service.
Recycle if appropriate facilities/equipment available.
Follow all local/regional/national/international regulations.
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.

This product is not hazardous under the applicable DOT, ICAO/IATA, or IMDG regulations.

15. REGULATORY INFORMATION

TSCA Inventory
Exempt

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.

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. In this document the British spelling was applied.

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), 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)

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course. Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-approved label.

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