1. PRODUCT AND COMPANY IDENTIFICATION

Product name
Ranger® PRO Herbicide

EPA Reg. No.
524-517

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: 314-694-4000 (collect calls accepted).

2. COMPOSITION/INFORMATION ON INGREDIENTS

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

Composition

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS No.</th>
<th>% by weight (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropylamine salt of glyphosate</td>
<td>38641-94-0</td>
<td>41</td>
</tr>
<tr>
<td>Other ingredients</td>
<td></td>
<td>59</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 / Sweet

CAUTION!
CAUSES EYE IRRITATION

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.

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.  
Wash clothes and clean shoes before re-use.

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.

5. FIRE-FIGHTING MEASURES

Flash point  
None.

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.
Notify authorities.

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

When using do not eat, drink or smoke.
Wash hands thoroughly after handling or contact.
Thoroughly clean equipment after use.
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.
Emptied containers retain vapour and product residue.
Refer to section 13 for disposal of rinse water.
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.

Storage

Minimum storage temperature: -15 °C
Maximum storage temperature: 50 °C
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.
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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Exposure Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropylamine 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**
No special requirement when used as recommended.
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.

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>Sweet</td>
</tr>
<tr>
<td>Flash point</td>
<td>None.</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.169 @ 20 °C / 15.6 °C</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: Completely miscible.</td>
</tr>
<tr>
<td>pH</td>
<td>4.4 - 5.0</td>
</tr>
<tr>
<td>Partition coefficient (log Pow)</td>
<td>≤ 0.00 (active ingredient)</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*: 5,108 mg/kg body weight
Practically non-toxic.
FIFRA category IV.
Acute dermal toxicity
  Rat, LD50 (limit test): > 5,000 mg/kg body weight
  Practically non-toxic.
  FIFRA category IV.
  No mortality.

Skin irritation
  Rabbit, 6 animals, OECD 404 test:
  Days to heal: 3
  Primary Irritation Index (PII): 0.5/8.0
  Essentially non irritating.
  FIFRA category IV.

Eye irritation
  Rabbit, 6 animals, OECD 405 test:
  Days to heal: 3
  Slight irritation.
  FIFRA category III.

Acute inhalation toxicity
  Rat, LC50, 4 hours, aerosol: 2.9 mg/L
  Other effects: weight loss, breathing difficulty
  Practically non-toxic.
  FIFRA category IV.

Skin sensitization
  Guinea pig, Buehler test:
  Positive incidence: 0 %

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

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, 3 generations:
  NOAEL toxicity: > 30 mg/kg body weight
  NOAEL reproduction: > 30 mg/kg body weight
  Target organs/systems in parents: none
Other effects in parents: none
Target organs/systems in pups: none
Other effects in pups: none

**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 product and components are summarized below.

**Aquatic toxicity, fish**

- **Rainbow trout (Oncorhynchus mykiss):**
  - Acute toxicity, 96 hours, static, LC50: 5.4 mg/L
  - Moderately toxic.

- **Bluegill sunfish (Lepomis macrochirus):**
  - Acute toxicity, 96 hours, static, LC50: 7.3 mg/L
  - Moderately toxic.

**Aquatic toxicity, invertebrates**

- **Water flea (Daphnia magna):**
  - Acute toxicity, 48 hours, static, EC50: 11 mg/L
  - Slightly toxic.

**Avian toxicity**

- **Mallard duck (Anas platyrhynchos):**
  - Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
  - Practically non-toxic.

- **Bobwhite quail (Colinus virginianus):**
  - Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
  - Practically non-toxic.

**Arthropod toxicity**

- **Honey bee (Apis mellifera):**
  - Oral/contact, 48 hours, LD50: > 100 µg/bee
  - Practically non-toxic.

**Soil organism toxicity, invertebrates**

- **Earthworm (Eisenia foetida):**
  - Acute toxicity, 14 days, LC50: > 1,250 mg/kg 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

13. DISPOSAL CONSIDERATIONS

Product
Excess product may be disposed of by agricultural use according to label instructions.
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.

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

15. REGULATORY INFORMATION

TSCA Inventory
All components are on the US EPA's TSCA Inventory

OSHA Hazardous Components
Surfactant

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.

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
<th>Additional Markings</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

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), LDL0 (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)

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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