SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier
Trade name: KROVAR® I DF HERBICIDE
Product code (UVP): 84104078
SDS Number: 102000030320
EPA Registration No.: 432-1551

Relevant identified uses of the substance or mixture and uses advised against
Use: Herbicide
Restrictions on use: See product label for restrictions.

Information on supplier
Supplier: Bayer Environmental Science
2 T.W. Alexander Drive
Research Triangle PK, NC 27709
United States
Responsible Department: Email: SDSINFO.BCS-NA@bayer.com
Emergency telephone no.
Emergency Telephone Number (24hr/ 7 days): 1-800-334-7577
Product Information Telephone Number: 1-800-331-2867

SECTION 2: HAZARDS IDENTIFICATION

Classification in accordance with regulation HCS 29CFR §1910.1200
Carcinogenicity, Specific target organ toxicity - repeated exposure: Category 2

Signal word: Warning

Hazard statements
Suspected of causing cancer.
May cause damage to organs through prolonged or repeated exposure.

Precautionary statements
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Do not breathe dust or mist. 
IF exposed or concerned: Get medical advice/attention. 
Store locked up. 
Dispose of contents/container in accordance with local regulation.

Hazard Not Otherwise Classified (HNOC) 
No other hazards known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazardous Component Name</th>
<th>CAS-No.</th>
<th>Concentration % by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>40.0</td>
</tr>
<tr>
<td>Diuron</td>
<td>330-54-1</td>
<td>40.0</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

Description of first aid measures

General advice
When possible, have the product container or label with you when calling a poison control center or doctor or going for treatment.

Inhalation
Move to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a physician or poison control center immediately.

Skin contact
Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately.

Eye contact
Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician or poison control center immediately.

Ingestion
Call a physician or poison control center immediately. Rinse out mouth and give water in small sips to drink. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Do not leave victim unattended.

Most important symptoms and effects, both acute and delayed

Symptoms
To date no symptoms are known.

Indication of any immediate medical attention and special treatment needed

Treatment
Appropriate supportive and symptomatic treatment as indicated by the patient's condition is recommended. There is no specific antidote.
SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

**Suitable**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable**
High volume water jet

Special hazards arising from the substance or mixture
Dangerous gases are evolved in the event of a fire.

Advice for firefighters
Firefighters should wear NIOSH approved self-contained breathing apparatus and full protective clothing.

Further information
Whenever possible, contain fire-fighting water by diking area with sand or earth. Do not allow run-off from fire fighting to enter drains or water courses. Keep out of smoke. Fight fire from upwind position.

Flash point
Not applicable

Auto-ignition temperature
420 °C / 788 °F

Lower explosion limit
0.135 g/l

Upper explosion limit
No data available

Explosivity
No data available

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

**Precautions**
Keep people away from and upwind of spill/leak. Use personal protective equipment. Avoid dust formation.

Methods and materials for containment and cleaning up

**Methods for cleaning up**
Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation. Clean contaminated floors and objects thoroughly, observing environmental regulations.

**Additional advice**
Do not allow to enter soil, waterways or waste water canal.

Reference to other sections
Information regarding safe handling, see section 7. Information regarding personal protective equipment, see section 8. Information regarding waste disposal, see section 13.
SECTION 7: HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle and open container in a manner as to prevent spillage. Avoid dust formation. Ensure adequate ventilation.

Advice on protection against fire and explosion Keep away from heat and sources of ignition. Take measures to prevent the build up of electrostatic charge. Dust may form explosive mixture in air.

Hygiene measures Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics.

Remove Personal Protective Equipment (PPE) immediately after handling this product. Remove and wash contaminated gloves, including the inside, before re-use. Remove soiled clothing immediately and clean thoroughly before using again. Wash thoroughly and put on clean clothing.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers Store in a cool, dry place and in such a manner as to prevent cross contamination with other crop protection products, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Update</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 mg/m³ (TWA)</td>
<td>02 2012</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 mg/m³/1 ppm (REL)</td>
<td>2010</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 mg/m³/1 ppm (TWA)</td>
<td>1989</td>
<td>OSHA Z1A</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 mg/m³/1 ppm (TWA)</td>
<td>06 2008</td>
<td>TN OEL</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 ug/m³ (AN ESL)</td>
<td>07 2011</td>
<td>TX ESL</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>100 ug/m³ (ST ESL)</td>
<td>07 2011</td>
<td>TX ESL</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 ppb (ST ESL)</td>
<td>07 2011</td>
<td>TX ESL</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>1 ppb (AN ESL)</td>
<td>07 2011</td>
<td>TX ESL</td>
</tr>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>10 mg/m³/1 ppm (TWA PEL)</td>
<td>08 2010</td>
<td>US CA OEL</td>
</tr>
<tr>
<td>Diuron</td>
<td>330-54-1</td>
<td>10 mg/m³</td>
<td>02 2012</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>
### Exposure controls

**Personal protective equipment**
In normal use and handling conditions please refer to the label and/or leaflet. In all other cases the following recommendations would apply.

**Respiratory protection**
When respirators are required, select NIOSH approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industry recommendations.

**Hand protection**
Chemical resistant nitrile rubber gloves

**Eye protection**
Safety glasses with side-shields

**Skin and body protection**
Wear long-sleeved shirt and long pants and shoes plus socks.

**General protective measures**
Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and warm/tepid water.
Keep and wash PPE separately from other laundry.

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>brown</td>
</tr>
<tr>
<td>Physical State</td>
<td>granular</td>
</tr>
<tr>
<td>Odor</td>
<td>none</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>5.6</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Bulk density</td>
<td>36 - 44 lb/ft³</td>
</tr>
</tbody>
</table>

*OES BCS: Internal Bayer CropScience "Occupational Exposure Standard"
Evaporation rate Not applicable
Boiling Point Not applicable
Melting / Freezing Point Not applicable
Water solubility dispersible
Minimum Ignition Energy Not applicable
Decomposition temperature No data available
Partition coefficient: n-octanol/water Not applicable
Viscosity Not applicable
Flash point Not applicable
Auto-ignition temperature 420 °C / 788 °F
Lower explosion limit 0.135 g/l
Upper explosion limit No data available
Explosivity No data available

SECTION 10: STABILITY AND REACTIVITY
Reactivity
Thermal decomposition No data available
Chemical stability Stable under normal conditions.
Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.
Conditions to avoid No data available
Incompatible materials No data available
Hazardous decomposition products No decomposition products expected under normal conditions of use.

SECTION 11: TOXICOLOGICAL INFORMATION
Exposure routes Eye contact, Skin contact, Inhalation
Immediate Effects Eye Moderate eye irritation.
Skin Harmful if absorbed through skin.

Ingestion May be harmful if swallowed.

Information on toxicological effects

**Acute oral toxicity**
LD50 (male/female combined Rat) 2,300 mg/kg

**Acute inhalation toxicity**
LC50 (male/female combined Rat) > 5.2 mg/l
Exposure time: 4 h

**Acute dermal toxicity**
LD50 (male/female combined Rabbit) > 2,000 mg/kg

**Skin irritation**
slight irritation (Rabbit)

**Eye irritation**
slight irritation (Rabbit)

**Sensitisation**
Non-sensitizing. (Guinea pig)

**Assessment repeated dose toxicity**
Diuron caused haemolytic anaemia in animal studies.

**Assessment mutagenicity**
Diuron was not mutagenic or genotoxic based on the overall weight of evidence in a battery of in vitro and in vivo tests.

**Assessment carcinogenicity**
Diuron caused at high dose levels an increased incidence of tumours in the following organ(s): urinary bladder, Mammary gland. The mechanism that triggers tumours in rodents is not relevant for the low exposures encountered under normal use conditions.

**ACGIH**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Number</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromacil</td>
<td>314-40-9</td>
<td>A3</td>
</tr>
<tr>
<td>Diuron</td>
<td>330-54-1</td>
<td>A4</td>
</tr>
</tbody>
</table>

**NTP**
None.

**IARC**
None.

**OSHA**
None.

**Assessment toxicity to reproduction**
Diuron did not cause reproductive toxicity in a two-generation study in rats.

**Assessment developmental toxicity**
Diuron did not cause developmental toxicity in rats and rabbits.

**Further information**
Only acute toxicity studies have been performed on the formulated product. The non-acute information pertains to the active ingredient(s).
SECTION 12: ECOLOGICAL INFORMATION

Toxicity to fish
- LC50 (Oncorhynchus mykiss (rainbow trout)) 36 mg/l
  Exposure time: 96 h
  The value mentioned relates to the active ingredient bromacil.
- LC50 (Oncorhynchus mykiss (rainbow trout)) 14.7 mg/l
  Exposure time: 96 h
  The value mentioned relates to the active ingredient diuron.

Toxicity to aquatic invertebrates
- EC50 (Daphnia magna (Water flea)) 119 mg/l
  Exposure time: 48 h
  The value mentioned relates to the active ingredient bromacil.
- EC50 (Daphnia magna (Water flea)) 1.4 mg/l
  Exposure time: 48 h
  The value mentioned relates to the active ingredient diuron.

Toxicity to aquatic plants
- ErC50 (Raphidocelis subcapitata (freshwater green alga)) 0.017 mg/l
  Exposure time: 72 h
  The value mentioned relates to the active ingredient bromacil.

Biodegradability
- Diuron: Not rapidly biodegradable

Koc
- Diuron: Koc: 468 - 1666

Bioaccumulation
- Diuron: Bioconcentration factor (BCF) 15 - 340
  Does not bioaccumulate.

Mobility in soil
- Diuron: Slightly mobile in soils

Environmental precautions
- Do not allow to get into surface water, drains and ground water.
- Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.
- Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods
- Product: Dispose in accordance with all local, state/provincial and federal regulations.
  Do not contaminate water, food, or feed by disposal.
  Never place unused product down any indoor or outdoor drain.
- Contaminated packaging: Triple rinse containers.
  Do not re-use empty packagings.
Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State/Provincial and local authorities, by burning. If burned, stay out of smoke.

**RCRA Information**

Characterization and proper disposal of this material as a special or hazardous waste is dependent upon Federal, State and local laws and are the user's responsibility. RCRA classification may apply.

---

**SECTION 14: TRANSPORT INFORMATION**

<table>
<thead>
<tr>
<th>49CFR</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>3077</td>
<td>3077</td>
</tr>
<tr>
<td>Class</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Packaging group</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Environmentally Hazardous</td>
<td>YES</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (DIURON)</td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (DIURON, BROMACIL MIXTURE)</td>
</tr>
<tr>
<td>RQ</td>
<td>Reportable Quantity is reached with 250 lb of product.</td>
<td></td>
</tr>
</tbody>
</table>

This transportation information is not intended to convey all specific regulatory information relating to this product. It does not address regulatory variations due to package size or special transportation requirements.

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**SECTION 15: REGULATORY INFORMATION**

EPA Registration No. 432-1551
US Federal Regulations
TSCA list
Diuron 330-54-1
US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)
None.
SARA Title III - Section 302 - Notification and Information
None.
SARA Title III - Section 313 - Toxic Chemical Release Reporting
Bromacil 314-40-9 1.0%
Diuron 330-54-1
US States Regulatory Reporting
CA Prop65
This product contains a chemical known to the State of California to cause cancer.
Diuron 330-54-1

US State Right-To-Know Ingredients
Bromacil 314-40-9 CA, MN, NJ, RI
Diuron 330-54-1 CA, CT, IL, MN, NJ, RI

Canadian Regulations
Canadian Domestic Substance List
None.

Environmental
CERCLA
Diuron 330-54-1
Clean Water Section 307 Priority Pollutants
None.
Safe Drinking Water Act Maximum Contaminant Levels
Diuron 330-54-1

EPA/FIFRA Information:
This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information required on the pesticide label:
Signal word: Caution!
Hazard statements: Harmful if swallowed or absorbed through skin.
Moderate eye irritation.
Avoid contact with skin, eyes and clothing.
Keep out of the reach of children.

SECTION 16: OTHER INFORMATION

Abbreviations and acronyms
49CFR Code of Federal Regulations, Title 49
ACGIH        US. ACGIH Threshold Limit Values
CAS-Nr.      Chemical Abstracts Service number
EINECS      European inventory of existing commercial substances
ELINCS      European list of notified chemical substances
IARC       US. IARC Monographs on Occupational Exposures to Chemical Agents
IATA       International Air Transport Association
IMDG       International Maritime Dangerous Goods
N.O.S.      Not otherwise specified
NTP        US. National Toxicology Program (NTP) Report on Carcinogens
OECD       Organization for Economic Co-operation and Development
TDG        Transportation of Dangerous Goods
TWA        Time weighted average
UN         United Nations
WHO        World health organisation

NFPA 704 (National Fire Protection Association):
          Health - 1  Flammability - 1  Instability - 0  Others - none

          Health - 1  Flammability - 1  Physical Hazard - 0  PPE -

Reason for Revision: Reviewed and updated for general editorial purposes. The following sections have been revised: Section 2: Hazards Identification. Section 5: Fire Fighting Measures. Section 8: Exposure Controls / Personal Protection. Section 9: Physical and Chemical Properties. Section 12. Ecological information.

Revision Date: 03/14/2016

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