DOW AGROSCIENCES LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: SPIKE™ 20P Herbicide Specialty

Recommended uses of the chemical and restrictions on use

Identified uses: End use herbicide product

COMPANY IDENTIFICATION
DOW AGROSCIENCES LLC
9330 ZIONSVILLE RD
INDIANAPOLIS IN  46268-1053
UNITED STATES

Customer Information Number: 800-992-5994
info@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 800-992-5994
Local Emergency Contact: 352-323-3500

2. HAZARDS IDENTIFICATION

Hazard classification
This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Carcinogenicity - Category 1A
Specific target organ toxicity - repeated exposure - Category 2 - Oral

Label elements
Hazard pictograms

Signal word: DANGER!
Hazards
May cause cancer.
May cause damage to organs (Pancreas) through prolonged or repeated exposure if swallowed.

Precautionary statements
Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response
IF exposed or concerned: Get medical advice/ attention.

Storage
Store locked up.

Disposal
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
no data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Mixture
This product is a mixture.

<table>
<thead>
<tr>
<th>Component</th>
<th>CASRN</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tebuthiuron</td>
<td>34014-18-1</td>
<td>20.0%</td>
</tr>
<tr>
<td>Silica, crystalline (quartz)</td>
<td>14808-60-7</td>
<td>32.8%</td>
</tr>
<tr>
<td>Balance</td>
<td>Not available</td>
<td>47.2%</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Description of first aid measures
General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.

Skin contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
**Eye contact:** Hold eyes 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 eyes. Call a poison control center or doctor for treatment advice. Suitable emergency eye wash facility should be available in work area.

**Ingestion:** No emergency medical treatment necessary.

**Most important symptoms and effects, both acute and delayed:** Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

**Indication of any immediate medical attention and special treatment needed**

**Notes to physician:** May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Repeated excessive exposure may aggravate preexisting lung disease.

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**5. FIREFIGHTING MEASURES**

**Suitable extinguishing media:** Water. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers.

**Unsuitable extinguishing media:** no data available

**Special hazards arising from the substance or mixture**

**Hazardous combustion products:** During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Sulfur oxides. Nitrogen oxides. Carbon monoxide. Carbon dioxide. Silicon oxides

**Unusual Fire and Explosion Hazards:** no data available

**Advice for firefighters**

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Soak thoroughly with water to cool and prevent re-ignition. Cool surroundings with water to localize fire zone. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the “Accidental Release Measures” and the “Ecological Information” sections of this (M)SDS.

**Special protective equipment for firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.
6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to section 7, Handling, for additional precautionary measures. Keep upwind of spill. Spilled material may cause a slipping hazard. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing dust or mist. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Good housekeeping and controlling of dusts are necessary for safe handling of product. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Store in a dry place. Store in original container. Do not store near food, foodstuffs, drugs or potable water supplies.

Storage stability

<table>
<thead>
<tr>
<th>Storage stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 year</td>
</tr>
<tr>
<td>Other data: Ambient</td>
</tr>
<tr>
<td>3 year</td>
</tr>
</tbody>
</table>

Other Temp and Other Humidity 37 °C (99 °F)

Other data: Unspecified

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

<table>
<thead>
<tr>
<th>Component</th>
<th>Regulation</th>
<th>Type of listing</th>
<th>Value/Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica, crystalline (quartz)</td>
<td>OSHA Z-1</td>
<td>TWA total dust</td>
<td>30 mg/m³ / %SiO2+2</td>
</tr>
<tr>
<td></td>
<td>OSHA Z-3</td>
<td>TWA respirable</td>
<td>10 mg/m³ / %SiO2+2</td>
</tr>
<tr>
<td></td>
<td>OSHA Z-3</td>
<td>TWA respirable</td>
<td>250 mppcf / %SiO2+5</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>TWA Respirable fraction</td>
<td>0.025 mg/m³, Silica</td>
</tr>
</tbody>
</table>

Exposure controls

Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.
Individual protection measures

**Eye/face protection:** Use chemical goggles.

**Skin protection**

**Hand protection:** Chemical protective gloves should not be needed when handling this material. Consistent with general hygienic practice for any material, skin contact should be minimized.

**Other protection:** No precautions other than clean body-covering clothing should be needed.

**Respiratory protection:** Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance**

| Physical state | Pellets. |
| Color          | Gray to black |
| Odor           | Musty |
| Odor Threshold | no data available |
| pH             | 5.99 pH Electrode |

| Melting point/range | no data available |
| Boiling point (760 mmHg) | Not applicable |
| Flash point | closed cup Not applicable |
| Evaporation Rate (Butyl Acetate = 1) | Not applicable |

| Flammability (solid, gas) | No |
| Lower explosion limit | Not applicable |
| Upper explosion limit | Not applicable |
| Vapor Pressure | Not applicable |
| Relative Vapor Density (air = 1) | Not applicable |
| Relative Density (water = 1) | no data available |
| Water solubility | insoluble, but disintegrates in water |
| Partition coefficient: n-octanol/water | no data available |
| Auto-ignition temperature | > 750 °C (> 1,382 °F) |
| Decomposition temperature | no data available |
| Dynamic Viscosity | Not applicable |
| Kinematic Viscosity | no data available |
| Explosive properties | no data available |
| Oxidizing properties | no data available |
**10. STABILITY AND REACTIVITY**

**Reactivity:** No dangerous reaction known under conditions of normal use.

**Chemical stability:** Thermally stable at typical use temperatures.

**Possibility of hazardous reactions:** Polymerization will not occur.

**Conditions to avoid:** Exposure to elevated temperatures can cause product to decompose.

**Incompatible materials:** Avoid contact with: Hydrogen fluoride Strong oxidizers.

**Hazardous decomposition products:** Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: carbon monoxide Carbon dioxide Nitrogen oxides Sulfur oxides Silicon oxides.

**11. TOXICOLOGICAL INFORMATION**

*Toxicological information on this product or its components appear in this section when such data is available.*

**Acute toxicity**

**Acute oral toxicity**

Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

As product:
LD50, Rat, male and female, > 2,000 mg/kg No deaths occurred at this concentration.

**Acute dermal toxicity**

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product:
LD50, Rabbit, male and female, > 2,000 mg/kg No deaths occurred at this concentration.

**Acute inhalation toxicity**

No adverse effects are anticipated from single exposure to dust. Dust may cause irritation of the upper respiratory tract (nose and throat) and lungs. Excessive exposure may cause lung injury.

As product: The LC50 has not been determined.

**Skin corrosion/irritation**

Essentially nonirritating to skin.
Serious eye damage/eye irritation
May cause slight eye irritation.
May cause slight corneal injury.

Sensitization
For the active ingredient(s):
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
In animals, effects have been reported on the following organs:
Pancreas.

For the major component(s):
In humans, effects have been reported on the following organs:
Kidney.
Repeated excessive exposure to crystalline silica may cause silicosis, a progressive and disabling
disease of the lungs.

Carcinogenicity
For the active ingredient(s): Did not cause cancer in laboratory animals. For the major component(s):
Has caused cancer in laboratory animals. Has caused cancer in humans.

Teratogenicity
For the active ingredient(s): Did not cause birth defects or other effects in the fetus even at doses
which caused toxic effects in the mother. For the major component(s): Did not cause birth defects or
any other fetal effects in laboratory animals.

Reproductive toxicity
For the active ingredient(s): In animal studies, did not interfere with reproduction.

Mutagenicity
For the active ingredient(s): For the major component(s): In vitro genetic toxicity studies were
negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

COMPONENTS INFLUENCING TOXICOLOGY:

Tebuthiuron
Acute inhalation toxicity
No adverse effects are anticipated from single exposure to dust. Based on the available data,
respiratory irritation was not observed.

LC50, Rat, male and female, 4 Hour, dust/mist, > 5.78 mg/l No deaths occurred at this
concentration.

Silica, crystalline (quartz)
Acute inhalation toxicity
Vapors are unlikely due to physical properties. Dust may cause irritation of the upper
respiratory tract (nose and throat) and lungs. Excessive exposure may cause lung injury.

The LC50 has not been determined.

Balance

Acute inhalation toxicity
The LC50 has not been determined.

Carcinogenicity

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica, crystalline (quartz)</td>
<td>IARC</td>
<td>Group 1: Carcinogenic to humans</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>A2: Suspected human carcinogen</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data
is available.

Toxicity

Tebuthiuron

Acute toxicity to fish
Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 < 0.1 mg/L in
the most sensitive species).
Material is very toxic to aquatic organisms (LC50/EC50/IC50 below 1 mg/L in the most
sensitive species).
LC50, Lepomis macrochirus (Bluegill sunfish), static test, 96 Hour, 106 mg/l
LC50, Danio rerio (zebra fish), 96 Hour, 31.07 mg/l

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), semi-static test, 48 Hour, > 100 mg/l
EC50, pink shrimp (Penaeus duorarum), static test, 48 Hour, 62 mg/l

Acute toxicity to algae/aquatic plants
ErC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, > 0.1 mg/l
EC50, diatom Navicula sp., 7 d, 0.213 mg/l
EC50, Skeletonema costatum, 7 d, 0.01 mg/l
EC50, Lemna gibba, 14 Hour, 0.235 mg/l

Chronic toxicity to fish
NOEC, Pimephales promelas (fathead minnow), flow-through test, 33 d, growth, 9.3 mg/l
NOEC, Oncorhynchus mykiss (rainbow trout), flow-through test, 45 d, survival, 26 mg/l

Chronic toxicity to aquatic invertebrates
Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 21.8 mg/l

Toxicity to Above Ground Organisms
Material is slightly toxic to birds on a dietary basis (LC50 between 1001 and 5000 ppm).
Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).
dietary LC50, Anas platyrhynchos (Mallard duck), 8 d, > 5093 mg/kg diet.
oral LD50, Anas platyrhynchos (Mallard duck), > 2000mg/kg bodyweight.
dietary LC50, Taeniopygia guttata (Zebra Finch), 8 d, 1636mg/kg diet.
oral LD50, Apis mellifera (bees), > 100µg/bee
contact LD50, Apis mellifera (bees), 48 Hour, > 100µg/bee

Silica, crystalline (quartz)
Acute toxicity to fish
Not expected to be acutely toxic to aquatic organisms.

Balance
Acute toxicity to fish
No relevant data found.

Persistence and degradability

Tebuthiuron
Biodegradability: Material is not readily biodegradable according to OECD/EEC guidelines.

Theoretical Oxygen Demand: 2.66 mg/mg

Stability in Water (1/2-life)
, > 64 d, pH 3 - 9

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 3.225 d
Method: Estimated.

Silica, crystalline (quartz)
Biodegradability: Biodegradation is not applicable.

Balance
Biodegradability: No relevant data found.

Bioaccumulative potential

Tebuthiuron
Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 1.83 Measured
Bioconcentration factor (BCF): 1.98 - 3.4  Lepomis macrochirus (Bluegill sunfish) Measured

Silica, crystalline (quartz)
Bioaccumulation: Partitioning from water to n-octanol is not applicable.

Balance
Bioaccumulation: No relevant data found.

Mobility in soil

Tebuthiuron
Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient(Koc): 27
13. DISPOSAL CONSIDERATIONS

Disposal methods: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(Tebuthiuron)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN 3077</td>
</tr>
<tr>
<td>Class</td>
<td>9</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Tebuthiuron</td>
</tr>
<tr>
<td>Transport in bulk according to Annex I or II</td>
<td>Consult IMO regulations before transporting ocean bulk</td>
</tr>
<tr>
<td>of MARPOL 73/78 and the IBC or IGC Code</td>
<td></td>
</tr>
</tbody>
</table>

Classification for AIR transport (IATA/ICAO):

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>Environmentally hazardous substance, solid, n.o.s.(Tebuthiuron)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN 3077</td>
</tr>
<tr>
<td>Class</td>
<td>9</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
</tbody>
</table>

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.
15. REGULATORY INFORMATION

OSHA Hazard Communication Standard
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Immediate health hazard
Delayed (chronic) Health Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
Components

<table>
<thead>
<tr>
<th></th>
<th>CASRN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tebuthiuron</td>
<td>34014-18-1</td>
</tr>
</tbody>
</table>

Pennsylvania Worker and Community Right-To-Know Act:
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components

<table>
<thead>
<tr>
<th></th>
<th>CASRN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica, crystalline (quartz)</td>
<td>14808-60-7</td>
</tr>
</tbody>
</table>

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

United States TSCA Inventory (TSCA)
This product contains chemical substance(s) exempt from U.S. EPA TSCA Inventory requirements. It is regulated as a pesticide subject to Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements.

Federal Insecticide, Fungicide and Rodenticide Act
EPA Registration Number: 62719-121
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 as required on the pesticide label:

CAUTION
Harmful if swallowed, inhaled or absorbed through the skin.
Causes moderate eye irritation

16. OTHER INFORMATION

Hazard Rating System
NFPA

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Revision

Identification Number: 101200090 / A211 / Issue Date: 05/04/2015 / Version: 2.0

DAS Code: FN-1150

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>ACGIH</th>
<th>USA. ACGIH Threshold Limit Values (TLV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA Z-1</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td>OSHA Z-3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-3 Mineral Dusts</td>
</tr>
<tr>
<td>TWA</td>
<td>8-hour, time-weighted average</td>
</tr>
</tbody>
</table>

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

DOW AGROSCIENCES LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer’s/user’s responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer’s/user’s duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.