Urea: Product Identification

Trade Name: Urea
Synonyms: Urea Feed, 46-0-0, Carbamide; Carbonyldiamide; Aquadrate; Ureaphil; Ureophil
Chemical Family: Amide
Chemical I.D. No.: STCC # 2818170
Chemical Formula: CO(NH₂)₂
DOT Hazard Class: None
Label Required: None

Urea: Composition

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS Number</th>
<th>Wt%</th>
<th>OSHA PEL¹</th>
<th>ACGIH STEL²</th>
<th>NIOSH IDLH³</th>
<th>ACGIH TLV</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>57-13-6</td>
<td>98.5%</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>15⁴</td>
<td>mg/m³</td>
</tr>
<tr>
<td>Biuret</td>
<td>108-19-0</td>
<td>&lt; 1.2%</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>ppm</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>0.25-0.4%</td>
<td>0.75 (2 (ST))</td>
<td>0.3 (ceiling)</td>
<td>20 Ca** (ceiling)</td>
<td>0.3 (ceiling)</td>
<td>ppm</td>
</tr>
</tbody>
</table>

¹ = Permissible Exposure Limit (8-Hr. Time Weighted Average).
² = Short Term Exposure Limit (15 Minute Exposure).
³ = Immediately Dangerous to Life and Health.
⁴ = 15 mg/m³ Total Nuisance Dust (8-Hr. Time Weighted Average).
Ca** = NIOSH has recommended that this substance be treated as a potential human carcinogen.
N.A. = Not Available

Urea: NFPA Code

1 Health Hazard (Blue):
   Can cause irritation if not treated.

0 Flammability Hazard (Red):
   Will not burn.

0 Reactivity Hazard (Yellow):
   Normally stable. Not reactive with water.

NONE Special Notice (White):
   None
Urea: Physical and Chemical Properties

- Melting Point: 271°F (133°C)
- Decomposition Temperature: 275°F (135°C)
- Nitrogen Content: 46.65% (pure)
- Solubility in H₂O: 112.4g / 100g
- Specific Gravity: 52 lb/cu.ft. @ 68°F (20°C) (0.83 g/cc)
- pH: 7.0-7.5 (1 molar solution)
- Odor: Slight Ammonia Odor
- Appearance: White Crystal

Urea: Fire and Explosion Data

- Flash Point: N.A.
- Flammable Limits in Air %/Vol.: Lower: N.A., Upper: N.A.
- Autoignition Temperature: N.A.
- Extinguishing Media: N.A.

Special Fire Fighting Procedure: Fire-fighters should wear self-contained breathing apparatus and full protective clothing.

Unusual Fire or Explosion Data: Urea solid will not burn or support combustion but will decompose into noxious, poisonous gas when exposed to the high temperatures of a fire.

Urea: Reactivity Data

- Stability: Stable at room temperature, decomposes at high temperature. Can be made explosive when dissolved in Nitric Acid, even without completely drying.
- Hazardous Polymerization: Will not occur
- Conditions to avoid / Incompatibility: Nitric Acid, gallium, perchlorate, strong oxidizing agents, caustics and alkalis.
- Hazardous Decomposition Products: Carbon Dioxide, and Ammonia (Ammonia oxidized further to Nitric Oxide and Nitrogen Dioxide).
Urea: Health Hazard Data

<table>
<thead>
<tr>
<th>Carcinogenicity:</th>
<th>NTP</th>
<th>IARC Monographs</th>
<th>OSHA Regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Biuret</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Occupational Exposure Limits:

OSHA Permissible Exposure Limit (PEL):
- Urea = None established
- Biuret = None established
- Formaldehyde = 1 ppm for an 8 hour Time Weighted Average

ACGIH Short-term Exposure Limit (STEL):
- Urea = None established
- Biuret = None established
- Formaldehyde = 2 ppm; 15 minutes; Short-term Exposure Limit

NIOSH Immediately Dangerous to Life and Health (IDLH):
- Urea = None established
- Biuret = None established
- Formaldehyde = 30 ppm

ACGIH Threshold Limit Value (TLV):
- Urea Feed = 15 mg/m^3 Total Nuisance Dust (8 Hr. Time Weighted Average).

Effects of Overexposure:

Acute:

Eyes: Dust and micro particles may cause eye irritation.

Skin: Frequent or prolonged contact with dust may aggravate preexisting dermatitis and possibly promote an allergic reaction.

Inhalation: Excessive inhalation of the dust may cause sore throat, coughing and irritation of mucous membranes and the respiratory tract.

Ingestion: Abdominal pain, nausea, vomiting and gastrointestinal irritation may result. (Urea is a protein to ruminants, animals with the enzyme Urease in their digestive systems, but is toxic to humans).

Chronic: None known for Urea.
**Urea: Additional Medical and Toxicological Information**

Formaldehyde is used as a crystal modifier in the Urea prill. The formaldehyde is bound as Methylene Diurea and can only be released when the Urea dissolves. Ingestion is the most probable means by which the formaldehyde would be freed. IARC, NTP and OSHA have listed formaldehyde as a probable human carcinogen. No formaldehyde vapor is present in Urea feed; however be warned that long-term inhalation exposure to formaldehyde vapor has been associated with nasal cancer in experimental animals. Epidemiological studies have reported increased nasal and nasopharyngeal cancer in humans exposed to formaldehyde vapor. Certain individuals may be sensitive to formaldehyde and may experience an allergic skin reaction when perspiring and when handling this product. Reports suggest that formaldehyde vapor aggravates preexisting respiratory disorders and may cause asthma.

**Urea: Emergency First Aid Procedures**

**Eye contact:** Immediately flush with large amounts of water, including under the eyelids. If pain persists seek medical attention, preferably an Ophthalmologist. Speed and thoroughness in rinsing eyes are important to avoid permanent injury.

**Skin Contact:** Immediately remove contaminated clothing and shoes. Wash affected area with soap and flush with large amounts of water. Seek medical attention if irritation develops.

**Inhalation:** Remove to fresh air. If breathing has stopped, apply artificial respiration. Keep warm and at rest. Get medical attention immediately.

**Ingestion:** Do not induce vomiting. If vomiting occurs, keep head below hips to help prevent aspiration. Get medical attention immediately.

**Urea: Special Protection Information**

**Eye Protection:** Urea is water soluble and will dissolve with mucosal membrane contact (eyes). Remove contact lenses and wear safety glasses, chemical goggles or face shield where contact with dust or micro particles may occur.

**Skin Protection:** Urea is water soluble and will dissolve with perspiration contact. Wearing of appropriate protective clothing and gloves is suggested if epidermal sensitivity develops.

**Inhalation:** Urea is water soluble and will dissolve with mucosal membrane contact (lungs). Use approved respiratory protective equipment for cleaning large spills or upon entry into large tanks, vessels, and other designated confined space areas or in any situations where airborne concentrations may exceed occupational exposure limits (15 mg/m³).

**Ventilation:** Provide adequate general and local exhaust ventilation to avoid reaching occupational exposure limits, particularly in a confined space area.

**Urea: Spill or Leak**

**Spill Procedures:** Shovel spilled material into containers for disposal. Do not flush to surface water. Spilled chemical can be used as fertilizer (46-0-0).

*Consult DOT “Emergency Response Guidebook” - Guide 171*
Urea: Waste Disposal

Procedure: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

Urea: Special Precautions and Comments

Storage Precautions: Store away from incompatible materials or sources of heat and ignition. Empty containers may contain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flames, sparks or other sources of ignition; they may evolve noxious fumes.

Urea: EPA SARA Title III Information

EPCRA Section 311/312 Hazard Categorization:

<table>
<thead>
<tr>
<th></th>
<th>Acute</th>
<th>Chronic</th>
<th>Fire</th>
<th>Pressure</th>
<th>Reactive</th>
</tr>
</thead>
</table>

EPCRA & CAA Hazardous Substances:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No.</th>
<th>% / wt.</th>
<th>CAA 112(r)</th>
<th>302 TPQ lb.</th>
<th>304 RQ lb.</th>
<th>313 TRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>0.25 - 0.40</td>
<td>15,000</td>
<td>500</td>
<td>100</td>
<td>X</td>
</tr>
</tbody>
</table>

Key: CAA 112(r) = Toxic Substance with potential for airborne release
Sec. 302 TPQ = Extremely Hazardous Substances (EHS) Threshold Planning Quantity
Sec. 304 RQ = EHS and CERCLA Reportable Quantity if spilled
Sec. 313 TRI = Toxic Chemicals to be reported on Toxic Release Inventory if spilled

Urea: California Proposition 65 Warning

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in this product. We are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling this chemical product.

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