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Co. Registration No. 200405572W  
GST Registration No. 200405572W

## MATERIAL SAFETY DATA SHEET

### UREA 46% (CARBAMIDE) FERTILIZER

**Version:** Global  
**Date Approved:**  
**Revision No:** 1

#### CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** UREA 46% (CARBAMIDE) FERTILIZER

**ACTIVE INGREDIENT:** Nitrogen 46%

**CHEMICAL FAMILY:** Amides

**MOLECULAR FORMULA:** CH<sub>4</sub>N<sub>2</sub>O

**SYNONYMS:** Carbamide, carbonyldiamine, carbonyl diamide

#### MANUFACTURER

IVORYCHEM PTE LTD  
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#### Emergency Telephone Numbers:

**Emergency Phone** [contact@ivorychem.com](mailto:contact@ivorychem.com) (Please refer local label for Emergency Numbers in your region).

#### COMPOSITION / INFORMATION ON INGREDIENTS

Component Name	Weight Percentage	CAS Number
Urea	95.4 - 97.6	57-13-6
Biuret (H <sub>2</sub> NCONHCONH <sub>2</sub> )	1.0 - 1.5	108-19-0
Water	0.1 - 0.4	7732-18-5
Urea reaction products with formaldehyde (primarily methylenediurea)	1.3 - 2.7	68611-64-3



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## HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Caution. When heated, decomposes to carbon dioxide and ammonia; if burned, emits small amounts of nitrogen oxides. Can cause redness and irritation of skin and eyes.

**IMMEDIATE CONCERNS:** White granules with either no odor or having a slight odor of ammonia (in presence of moisture).

### POTENTIAL HEALTH EFFECTS:

Urea is not classified as a hazardous product. Normally, by paying usual attention to industrial hygiene and by avoiding inhalation of dusty powder, there are no risks in handling urea. The product contact should be avoided with oxidizing agents, hypochlorites, aldehydes, inorganic acids, olefins, monomers and polymerisable esters to avoid possible release of toxic fumes of ammonia, isocyanic acid, oxides of nitrogen and biuret..

**Eyes :** May cause irritation, redness and pain but does not injure eye tissue.

**Skin :** Not expected to be toxic by dermal exposure. May cause irritation, redness, itching, and pain.

**Inhalation :** Not expected to be toxic by inhalation. Urea dust may cause irritation of the nose, throat, and respiratory tract.

**Ingestion :** Not found to be toxic by oral exposure. May cause irritation of the digestive tract if ingestion. Nausea and vomiting may occur after exposure to large quantities.

**MEDICAL CONDITIONS AGGRAVATED:** Conditions aggravated by exposure may include skin disorders and respiratory (asthma-like) disorders. Urea is not known to cause mutagenic, carcinogenic, or reproductive effects from concentrations or exposure routes normally experienced in the workplace.

## FIRST AID MEASURES

**EYES:** Flush / irrigate eyes with large amount of water for at least 10 minutes until irritation subsides. If eye irritation persists, seek medical attention.

**SKIN:** Wash the affected areas with soap and water.

**INGESTION:** : Do not induce vomiting. Give water or milk to drink. Obtain medical attention if more than small quantities have been swallowed.

**INHALATION:** Remove from source of exposure to dust. Keep warm and at rest. Obtain medical advice if symptoms persist.

**NOTES TO MEDICAL DOCTOR:** No specific antidote. Treatment is symptomatic.

The dust may cause irritation to eyes, skin and by inhalation.

## FIRE FIGHTING MEASURES

**EXTINGUISHING MEDIA:** Use extinguishing method suitable for surrounding fire. Material will not burn.

**EXPLOSION HAZARDS:** May be explosive on contact with halogens such as chlorine. Non-explosive from open flames and sparks, shocks, heat, oxidizing materials, combustible materials, organic materials, metals, acids, alkalis, or moisture.



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**FIRE FIGHTING PROCEDURES:** Fire fighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Keep unnecessary people away, isolate hazard area and deny entry. Evacuate residents who are downwind of fire. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later. Persons who may have been exposed to contaminated smoke should be immediately examined by a physician and checked for symptoms of poisoning. The symptoms should not be mistaken for heat exhaustion or smoke inhalation.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Undergoes thermal decomposition at elevated temperatures to produce solid cyanuric acid and release toxic and combustible gases (ammonia, carbon dioxide, and oxides of nitrogen).

### ACCIDENTAL RELEASE MEASURES

**EVACUATION PROCEDURES AND SAFETY:** Wear appropriate gear for the situation. See Personal Protection information.

**CLEANUP AND DISPOSAL OF SPILL:** Sweep up spilled material and place in suitable containers for recycle or disposal. Any spillage of fertilizer should be cleaned up promptly, swept up and placed in a clean, labelled, open container for safe disposal. See Disposal Consideration information.

**CONTAINMENT OF SPILL:** Follow procedure under Cleanup and Disposal of Spill.

**ENVIRONMENTAL AND REGULATORY REPORTING:** Relevant authorities must be consulted before disposal of urea to drains or water courses. If spilled urea enters a water course then the appropriate water authority and local authorities should be informed. Depending on the degree and nature of contamination, dispose of by use as a fertilizer on farm by spreading thinly on open ground or to an authorised waste facility.

### HANDLING AND STORAGE

**HANDLING PROCEDURES:** Avoid excessive generation of dust. Avoid unnecessary exposure to the atmosphere to prevent moisture pick-up. When handling the product over long periods use appropriate personal protective equipment e.g. gloves.

**STORING PROCEDURES:** Storage should be in absence of source of heat or fire and moisture to prevent lumps and dust forming. Storage may be in bulk or polyethylene bags. Ensure high standard of housekeeping in the storage area. Any building used for the storage should be dry and well ventilated.

For More Details including effects on environment email [contact@ivorychem.com](mailto:contact@ivorychem.com) with Subject "UREA 46% CARBAMIDE DETAILS".

**WORK/HYGIENIC PROCEDURES:** Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material. Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored. Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet. Wash exposed skin promptly to remove accidental splashes of contact with this material.

In addition, based upon the specific hazard of this product. Do not take clothing/objects contaminated by this material off the work site. Shower and change into street clothes before leaving the work site.

**MIN/MAX STORAGE TEMPERATURES:** Melting point at 133 deg C (decomposes)



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## EXPOSURE CONTROLS / PERSONAL PROTECTION

**PERSONAL PROTECTION** : For open systems where contact is likely, wear safety glasses with side shields, long sleeves and chemical resistant gloves. Where over-exposure by inhalation may occur, and engineering, work practice or other means of exposure reduction are not adequate, approved respirators may be necessary. Wear suitable gloves when handling the product over long periods. Use suitable dust respirator if dust concentration is high.

### Exposure guidelines

The recommended time weighted average exposure limits are as follows: -

Long term Exposure Limit (OEL)  
(TWA-8 hr)

	mg/m <sup>3</sup>	ppm
Ammonia	18	25
Nitrogen Dioxide *	5	3
Nitrogen Dioxide	30	25
Isocyanic acid	0.02	

Short term Exposure Limit (STEL)  
(TWA-10 min)

	mg/m <sup>3</sup>	ppm
Ammonia	24	35
Nitrogen Dioxide *	9	5
Nitrogen Dioxide	45	35
Isocyanic acid	0.07	

\* Most toxic component of NOx

ACGIH recommended value (1995-96) for inhalable particulate :  
TLV/TWA : 10mg/m<sup>3</sup>

## PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** White granules or prills or crystals

**CHEMICAL NAME:** Carbamide

**MOLECULAR WEIGHT:** 60

**DECOMPOSITION TEMPERATURE:** 133 deg C

**WATER SOLUBILITY:** 1080g/l at 20°C

**SOLUBILITY IN OTHER SOLVENTS:** Soluble in common organic solvents including acetone, toluene, and xylene (211)

**BOILING POINT:** Melting point at 133°C (decomposes)

**SOLIDIFYING POINT:** Not available

**VAPOR PRESSURE:** 0.08 kPa

**VISCOSITY:** Not available



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pH of 10% water solution: 8.0 – 10.0  
**FLASH POINT:** Not available  
**PARTITION COEFFICIENT:** Not available  
**ADSORPTION COEFFICIENT:** Not available  
 Odour : Odourless  
 Nitrogen : 46% minimum  
 Bulk Density : 700 – 780 kg/m<sup>3</sup>  
 Flammability (solids) : Not flammable  
 (Method A10 EEC)

Explosive properties : Uncontaminated urea is not an explosion hazard. However it may form explosive mixtures subject to spontaneous detonation when contaminated with strong acid (nitric or perchloric) or nitrates.  
 Oxidizing properties : None.

UREA 46% (CARBAMIDE)	Prilled	Granulated
Nitrogen	46% min	
Biuret	1% max	
Bunter		1% max by weight
Moisture	0.5% max by Fisher	1% max by weight
	0.3% max dryer	
Anti-caking agent	0.5% max	treated against anti caking
Prilled	95%	
Free ammonia	160 pxt ppm max	
Granulation	1 - 4 mm, 90% min	2 - 4 mm 90%
		lesser than 2 mm 1%
		greater than 3 mm 4%
Color	standard white or pure white	
Free flowing	100% anticaking treated	
Physical	free from harmful substance, impurities, dust	
Radiation	certified fully non-radioactive 100% free flowing	



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#### **STABILITY AND REACTIVITY**

**CONDITIONS TO AVOID:** Heating above melting point. Welding or hot work on equipment or plant which may have contained fertilizer without first washing thoroughly to remove all fertilizer.

**STABILITY:** The product is stable under normal conditions of storage, handling and use.

**INCOMPATIBLE MATERIALS:** Strong oxidizers, acids, alkalies, nitrates, sodium or calcium hypochlorite.

**HAZARDOUS DECOMPOSITION:** Urea reacts with sodium or calcium hypochlorite to form explosive nitrogen trichloride.

**HAZARDOUS REACTIONS:** Not applicable

#### **TOXICOLOGICAL INFORMATION**

##### **ACUTE TOXICITY:**

Toxicity Data

LD50 (oral, rat) > 2000 mg/kg

##### **LOCAL EFFECTS:**

Eye Contact : Irritating but does not injure eye tissue.

Skin Contact : Frequent or prolonged contact may irritate. Low order of toxicity.

Inhalation : Negligible hazard at ambient temperature. Decomposition fumes may cause breathing disorders and/or lung damage. High dust concentrations of air-borne material may cause irritation of the nose and upper respiratory tract.

Ingestion : Small quantities are unlikely to cause toxic effect. Large quantities may give rise to gastro-intestinal disorders.

##### **CHRONIC TOXICITY:**

In a chronic toxicity and carcinogenicity screening study conducted in mice over 12 months, urea was administered at 0, 0.45%, 0.9%, and 4.5% in the diet. No pathology was reported immediately following treatment period. After 4 months, testes, prostate, uterus were histologically examined for occurrence of tumors in the survivors. Although there was a statistically increased incidence of interstitial cell adenomas of the testes in the high dose group, its biological significance was deemed questionable, since the lesion may occur in 100% of controls.

Very low Carbaryl has been shown to cause tumors in laboratory animals in lifetime feeding studies. Carbaryl, when administered by various routes, at doses toxic to the maternal animals, has been shown to produce developmental toxicity in a number of species. Carbaryl produces no teratogenic effect in the absence of maternal toxicity.

Urea is not classified as a hazardous product. Normally, by paying usual attention to industrial hygiene and by avoiding inhalation of dusty powder, there are no risks in handling urea. The dust may cause irritation to eyes, skin and by inhalation.

By decomposition at high temperature toxic fumes of nitrogen oxide, ammonia and isocyanic acid can be emitted. These can also be produced by reaction of Urea with the chemicals. Product should not be heated above 130°C to avoid possible release of toxic fumes of ammonia, isocyanic acid



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and oxides of nitrogen. Contact should be avoided with oxidising agents, hypochlorites, aldehydes, inorganic acids, olefins, monomers and polymerisable esters to avoid possible release of toxic fumes of ammonia, isocyanic acid, oxides of nitrogen and biuret.

Product can accumulate static charges which can cause an incendiary electrical discharge, proper grounding procedures should be used.

When heated, urea decomposes releasing ammonia. In a fire, toxic fumes containing ammonia and NO<sub>x</sub> may be released.

#### **ECOLOGICAL INFORMATION**

Unless otherwise indicated, the data presented below are for the technical grade of active ingredient.

Urea is highly soluble in water. Therefore it is rapidly diluted in water courses and leached from soils. When dissolved, urea will act as a plant nutrient. It has low intrinsic aquatic toxicity but will exert a substantial oxygen demand when significant quantities as in a spillage reach a watercourse and may cause damage to aquatic life.

Large amounts of urea can damage plant seedlings and inhibit germination. As a readily available source of nitrogen, urea can also foster excessive growth of algae or microorganisms in water systems. Urea is non-toxic to aquatic organisms as defined by USEPA.

#### **ACUTE AND PROLONGED TOXICITY TO FISH:**

Fish  
LC50: >9,100 mg/L  
Exposure time: 96 h

Daphnia  
EC50: >10,000 mg/L  
Exposure time: 24 h

**ECOTOXICITY INFORMATION:** The cell multiplication toxicity threshold values for bacteria, green algae, and protozoa are >10,000, >10,000, and 29 mg/L, respectively. The critical range for the creek chub is 16,000 to 30,000 mg/L in Detroit river water.

**ENVIRONMENTAL FATE INFORMATION :** Particulate-phase urea is physically washed out of the atmosphere by dry and wet deposition. In the soil, urea degrades rapidly, usually within 24 hours; however, degradation may be slower depending on soil type, moisture content, and urea formulation. The ultimate degradation products are carbon dioxide and ammonia. The soil mobility is high based on an organic carbon partition coefficient of 8. In water, biodegradation to carbon dioxide and ammonia is the major fate pathway. The biodegrading rate increases with increasing temperature and pressure of phytoplankton. Oxidation of urea by nitrifying bacteria can increase biological oxygen demand. Bioaccumulation of urea is very low. The 72-hour bioconcentration factor (BCF) for carp is reported to be 1.



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#### **DISPOSAL CONSIDERATIONS**

**DISPOSAL METHOD:** Relevant authorities must be consulted before disposal of urea to drains or water courses. Sweep up spilled material and place in suitable containers for recycle or disposal. If spilled urea enters a water course then the appropriate water authority and local authorities should be informed. Any spillage of fertilizer should be cleaned up promptly, swept up and placed in a clean, labelled, open container for safe disposal. Depending on the degree and nature of contamination, dispose of by use as a fertilizer on farm by spreading thinly on open ground or to an authorised waste facility.

#### **TRANSPORT INFORMATION**

Urea is not classified, i.e. considered non-hazardous material according to UN Orange Book and International transport codes e.g. RID (rail), ADR (road) and IMDG (sea). Urea is not listed as a hazardous material by the U.S. Department of Transportation (DOT), Transport Canada (TC), International Maritime Organization (IMO), and the United Nations (UN).

#### **OTHER INFORMATION**

Section(s) Revised : New Format