

SAFETY DATA SHEET(SDS)

Section 1. Identification of the substance/mixture and of the company/undertaking

GHS product identifier	Technical Grade Urea (TGU)
Chemical name	urea
Product type	Solid
Manufacturer/Supplier :	NOVAX Material & Technology Inc. No.31, Ln. 142, Sec.2, Nankan Rd., Luzhu Dist., Taoyuan City 33855, Taiwan (R.O.C.) TEL: +886-3-3115988 FAX: +886-3-3115288 E-mail: yang@novax-material.com
Emergency Tel. Number	0800-200669 / (03) 311-5288

Section 2. Hazards identification

Classification of the substance or mixtur	Not classified.
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GHS label elements

Signal word	No signal word.
Hazard statements	No known significant effects or critical hazards

Precautionary statements

Prevention	Not applicable
Response	Not applicable
Storage	Not applicable
Disposal	Not applicable
Other hazards which do not result in classification	None known.

SECTION 3. Composition/information on ingredients

Substance/mixture	Substance
Chemical name	urea
Other means of identification	b-i-k; carbamide; carbamide resin; carbamimidic acid; carbonyl diamide

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	carbonyldiamine; isourea; nci-c02119; prespersion, 75 urea; pseudourea; ureaphil; ureophil; urevert; varioform ii
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CAS number/other identifiers

CAS number	57-13-6
EC number	200-315-5

SECTION 4. First aid measures

Description of necessary first aid measures

Eye contact	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

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Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	No known significant effects or critical hazards
Inhalation	Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact	No known significant effects or critical hazards
Ingestion	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	No specific data
Inhalation	No specific data
Skin contact	No specific data
Ingestion	No specific data

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours
Specific treatments	No specific treatment
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training

See toxicological information (Section 11)

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	Use an extinguishing agent suitable for the surrounding fire
Unsuitable extinguishing media	None known
Specific hazards arising from the chemica	No specific fire or explosion hazard

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<p>Hazardous thermal decomposition products</p>	<p>Decomposition products may include the following materials:</p> <ol style="list-style-type: none"> 1. carbon dioxide 2. carbon monoxide 3. nitrogen oxides
<p>Special protective actions for fire-fighters</p>	<p>Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire.</p> <p>No action shall be taken involving any personal risk or without suitable training</p>
<p>Special protective equipment for fire-fighters</p>	<p>Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.</p>

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

<p>For non-emergency</p>	<p>No action shall be taken involving any personal risk or without suitable training. :</p> <p>Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering.</p> <p>Do not touch or walk through spilled material.</p> <p>Put on appropriate personal protective equipment.</p>
<p>For emergency responders</p>	<p>If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".</p>
<p>Environmental precautions</p>	<p>Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution</p>

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	(sewers, waterways, soil or air).
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Methods and materials for containment and cleaning up

Small spill	Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
Large spill	Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

SECTION 7. Handling and storage

Precautions for safe handling	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept

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	<p>upright to prevent leakage.</p> <p>Do not store in unlabeled containers.</p> <p>Use appropriate containment to avoid environmental contamination.</p>
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SECTION 8. Exposure controls/personal protection

Control parameters Occupational exposure limits

Recommended monitoring procedures	<p>If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.</p>
Appropriate engineering controls	<p>No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits</p>
Environmental exposure controls	<p>Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.</p> <p>In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce</p>

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	emissions to acceptable levels
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Individual protection measures

<p>Hygiene measures</p>	<p>Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.</p> <p>Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.</p>
<p>Eye/face protection</p>	<p>Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.</p>
<p>Hand protection</p>	<p>Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.</p>
<p>Body protection</p>	<p>Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.</p>
<p>Other skin protection</p>	<p>Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.</p>

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Respiratory protection	Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
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SECTION 9. Physical and chemical properties

Appearance

Physical state	Solid. [Granular solid.]
Color	White
Odor	Odorless.
Odor threshold	Not available
pH	8 to 10 [Conc. (% w/w): 10%]
Melting point/freezing point	132.8°C (271°F)
Boiling point	Not available
Flash point	Not available
Burning time	Not available
Burning rate	Not available
Evaporation rate	Not available
Flammability (solid, gas)	Not available
Lower and upper explosive (flammable) limits	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility	Soluble in the following materials: cold water. 800 g/l
Partition coefficient: octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
SADT	Not available.
Viscosity	Not available.
Heat of combustion	-9.102 kJ/g

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SECTION 10. Stability and reactivity

Reactivity	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	No specific data.
Incompatible materials	No specific data.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11. Toxicological information

Information on toxicological effects

Acute toxicity

Exposure	Dose	Species	Result	Product/ingredient name
-	14300 mg/kg Gavage	Rat - Male	LD50 Oral	Urea

Irritation/Corrosion

Observation	Exposure	Score	Species	Result	Product/ingredient name
-	-	0	Rabbit	Skin - Erythema/Eschar	Urea
-	-	0	Rabbit	Skin - Erythema/Eschar	Urea
-	-	0.9	Rabbit	Eyes - Cornea opacity	Urea
-	-	0.4	Rabbit	Eyes - Iris lesion	Urea
-	-	2.2	Rabbit	Eyes - Edema of the conjunctivae	Urea

Conclusion/Summary

Skin	Non-irritating to the skin.
Respiratory	Non-irritating to the respiratory system.

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Sensitization

Not available.

Conclusion/Summary

Skin	Non-sensitizer to skin.
Respiratory	Non-sensitizer.

Mutagenicity

Result	Experiment	Test	Product/ingredient name
Positive	Experiment: In vivo Subject: Mammalian-Animal	-	Urea
Negative	Experiment: In vitro Subject: Bacteria	OECD 471 Bacterial Reverse Mutation Test	
Negative	Experiment: In vitro Subject: Bacteria	OECD 476 In vitro Mammalian Cell Gene Mutation Test	
Negative	Experiment: In vitro Subject: Bacteria	OECD 473 In vitro Mammalian Chromosomal Aberration Test	

Carcinogenicity

Not available

Reproductive toxicity

Not available.

Teratogenicity

Exposure	Dose	Species	Result	Product/ingredient name
-	500 mg/kg Gavage	Rat	Negative- Oral	Urea

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Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure

Not available.

Potential acute health effects

Eye contact	No known significant effects or critical hazards.
Inhalation	Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact	No known significant effects or critical hazards.
Ingestion	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	No specific data.
Inhalation	No specific data.
Skin contact	No specific data.
Ingestion	No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Potential immediate effects	Not available.
Potential delayed effects	Not available.

Long term exposure

Potential immediate effects	Not available.
Potential delayed effects	Not available.

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Potential chronic health effects

General	No known significant effects or critical hazards
Carcinogenicity	No known significant effects or critical hazards
Mutagenicity	No known significant effects or critical hazards
Teratogenicity	No known significant effects or critical hazards
Developmental effects	No known significant effects or critical hazards
Fertility effects	No known significant effects or critical hazards

Numerical measures of toxicity

Acute toxicity estimates

Not available.

SECTION 12. Toxicological information

Toxicity

Exposure	Species	Result	Product/ingredient name
24 hours	Daphnia - Daphnia magna	Acute EC50 >10000 mg/l Fresh water	Urea
96hours	Fish - Leuciscus idus	Acute LC50 >6810 mg/l	
192 hours	Algae - Microcystis aeruginosa	Acute NOEC 47 mg/l Fresh water	
72 hours	Micro-organism - Pseudomonas putida and Entosiphon sulcatum	Acute NOEC 29 mg/l Fresh water	

Persistence and degradability

Biodegradability	Photolysis	Aquatic half-lif	Product/ingredient name
Readily	-	-	Urea

Bioaccumulative potential

Potential	BCF	LogPow	Product/ingredient name
low	-	<1	Urea

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Mobility in soil

Soil/water partition coefficient (KOC)	Not available.
Other adverse effects	No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods	<p>The generation of waste should be avoided or minimized wherever possible.</p> <p>Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and nonrecyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.</p>
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Section 14. Transport information


	IATA	IMDG	UN
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No	No	No

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Additional information	-	-	-
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Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not available.
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Section 15. Regulatory information

Safety, health and environmental regulations specific for the product	No known specific national and/or regional regulations applicable to this product : (including its ingredients).
Chemical Weapons Convention List Schedule I Chemicals	Not listed
Chemical Weapons Convention List Schedule II Chemicals	Not listed
Chemical Weapons Convention List Schedule III Chemicals	Not listed
National Fire Protection Association (U.S.A.)	

Remarks :

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Section 16. Other information

Date of printing	2024.01.19
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Version	2
Made by	NOVAX Material & Technology Inc. <u>Ms. Maggie Chen</u> Laboratory Analysis and QC Hosting

Key to abbreviations

ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway

ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road

ATE = Acute Toxicity Estimate

BCF = Bioconcentration Factor

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

IBC = Intermediate Bulk Container

IMDG = International Maritime Dangerous Goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)

RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail

UN = United Nations