

DICYANDIAMIDE (DCDA)

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SECTION 1: IDENTIFICATION

1.1 GHS Product identifier:

DICYANDIAMIDE
Synonyms: DCDA; Cyanoguanidine; 2-Cyanoguanidine; Carbamonitrile
CAS: 461-58-5

Other means of identification:

Not relevant

1.2 Recommended use of the chemical and restrictions on use:

Relevant uses: Nitrification inhibitor in nitrogenous fertilisers; intermediate for melamine, guanidine and dicyandiamide-formaldehyde resins; curing agent/crosslinker for epoxy resins; flame-retardant intermediate; soldering-flux additive; dyeing and water-treatment auxiliary; pharmaceutical intermediate (e.g. biguanide derivatives). For industrial user only.
Uses advised against: All uses not specified in this section or in section 7.3.

1.3 Supplier's details:

SURAJ CHEMICALS
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Email: sales@surajchemicals.com | Website: www.surajchemicals.com
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1.4 Emergency phone number:

Emergency Contact No: +91 - 7092722822, +91 - 9840284032

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Eye Irrit. 2	Eye irritation, Category 2, H319
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Note: the majority of regulatory notifications for this substance report "not classified"; a minority report Eye Irrit. 2 (H319), which is adopted here as the conservative classification. Acute oral/dermal/inhalation toxicity classification criteria are not met (LD50 oral rat > 5000 mg/kg).

2.2 GHS label elements, including precautionary statements:

GHS: Warning

Hazard statements:

H319 – Causes serious eye irritation.

Precautionary statements:

P264: Wash exposed skin thoroughly after handling.
P280: Wear eye protection.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists, get medical advice/attention.

2.3 Other hazards which do not result in classification:

Combustible organic solid. Dust may cause transient mechanical irritation to the respiratory tract. Not a PBT or vPvB substance.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances:

Chemical description: Dicyandiamide
In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 461-58-5	Dicyandiamide — Eye Irrit. 2: H319 – Warning	≥ 99.5% (technical grade)

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

3.2 Mixtures:

Non-applicable

SECTION 4: FIRST AID MEASURES

4.1 Description of necessary first-aid measures:

Request medical assistance in case of discomfort or when in doubt, showing the SDS of this product.

By inhalation:

Remove to fresh air if dust is inhaled and irritation occurs.

By skin contact:

Wash with plenty of water and soap. Remove contaminated clothing.

By eye contact:

Rinse immediately and continuously with plenty of water for at least 15 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Seek medical attention if irritation persists.

By ingestion/aspiration:

Rinse the mouth with water. If a large quantity is swallowed, seek medical advice.

4.2 Most important symptoms/effects, acute and delayed:

Dust/contact with concentrated material causes serious eye irritation. No significant systemic effects expected at normal occupational exposure (very low acute toxicity).

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

Treat symptomatically. No specific antidote.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media:
Suitable: Water spray, foam, dry chemical powder, carbon dioxide.
Unsuitable: None known.

5.2 Specific hazards arising from the chemical:
Combustible organic solid. On combustion, may evolve oxides of nitrogen and, under incomplete-combustion conditions, trace hydrogen cyanide and ammonia, as is typical for nitrogen-rich organic compounds.

5.3 Special protective actions for fire-fighters:
Wear self-contained breathing apparatus and full protective clothing, given the potential for toxic combustion products (NOx, traces of HCN/ammonia).

Additional provisions:
Cool containers/bulk storage exposed to fire with water spray if safe to do so. Avoid dust-cloud ignition.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:
For non-emergency personnel:
Evacuate unnecessary personnel. Keep upwind. Ventilate the area. Use the personal protective equipment described in Section 8. Avoid contact with skin, eyes and clothing. Avoid generating and inhaling dust.
For emergency responders:
Wear suitable protective equipment as described in Section 8. Act only if trained and equipped for the task.

6.2 Environmental precautions:
Prevent large spills from entering drains, watercourses or soil. Nitrogen-containing compound; avoid large uncontrolled releases to water (nutrient-enrichment potential).

6.3 Methods and materials for containment and cleaning up:
Sweep up or vacuum (avoid dust generation) and place in a suitable, labelled container for reuse (preferred) or disposal.

6.4 Reference to other sections:
See sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling:
A. General precautions for safe use:
Avoid generating and inhaling dust. Avoid contact with eyes; use eye protection given the eye irritation classification.
B. Technical recommendations for the prevention of fires and explosions:
Avoid accumulation of fine dust and control ignition sources as a precaution against combustible dust. No other specific fire/explosion hazard under normal handling.
C. Technical recommendations on general occupational hygiene:
Do not eat, drink or smoke during handling; wash hands and exposed skin thoroughly after handling.
D. Technical recommendations to prevent environmental risks:
Avoid uncontrolled discharge to the environment. Follow the protective measures in Section 8.

7.2 Conditions for safe storage, including any incompatibilities:
A. Specific storage requirements:

Storage temperature	Ambient
Maximum shelf life	Typical value — refer to current specification sheet

B. General conditions for storage:
Store in a cool, dry, well-ventilated place in tightly closed containers/bags, away from strong acids, strong oxidisers and open flame/ignition sources.

7.3 Specific end use(s):
Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters:
No specific occupational exposure limit established for dicyandiamide. Treat as a nuisance dust: as a general guide, the Factories Act, 1948 framework recommends total inhalable dust not otherwise classified be kept below 10 mg/m³ (TWA, 8 hr) and respirable dust below 4 mg/m³ (TWA, 8 hr).

8.2 Appropriate engineering controls:
Ensure adequate general and/or local exhaust ventilation to keep exposure below the occupational exposure limits (where established) and to keep dust concentrations as low as reasonably practicable. Eyewash station and safety shower should be available in the work area. Consult the manufacturer's information leaflet for storage, use, cleaning and maintenance of PPE.

B. Respiratory protection:
Not normally required with adequate ventilation. Where dust levels may be exceeded, use a particulate filter (dust) mask.

C. Specific protection for the hands:
Protective gloves against minor risks (e.g. cotton or nitrile).

D. Eye and face protection:
Chemical safety goggles mandatory, given the eye irritation hazard (H319).

E. Bodily protection:
Standard industrial workwear; dust mask/apron for prolonged bulk handling.

F. Additional emergency measures:
Emergency shower (ANSI Z358-1, ISO 3864-1:2011, ISO 3864-4:2011) and eyewash stations (DIN 12 899, ISO 3864-1:2011, ISO 3864-4:2011) should be available in the immediate work area.

Environmental exposure controls:
Avoid release of the product to drains, soil and watercourses. See subsection 7.1.D and Section 12.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Appearance	
Physical state at 20°C	Solid (crystalline powder)
Appearance	White crystalline powder
Odor	Odourless
Odour threshold	Not relevant (odourless)
Volatility	
Boiling point at atmospheric pressure	Not applicable (decomposes before boiling)
Vapour pressure at 20°C	Negligible

Evaporation rate at 20°C	Not relevant (solid)
Product Description	
Density / Relative density at 20°C	1.40 g/cm³
Bulk density	Typical value — refer to current specification sheet
pH (aqueous suspension, 1% w/v)	≈ 6.0 – 7.5
Partition coefficient n-octanol/water (log Pow)	≈ -1.4 (low)
Solubility in water at 20°C	≈ 2.3 g/100 mL (slightly soluble; increases with temperature)
Decomposition temperature	Decomposes above melting point
Melting point/freezing point	207–209°C
Flammability	
Flash Point	Non-applicable (solid)
Flammability (solid, gas)	Combustible solid (not readily/spontaneously flammable)
Autoignition temperature	Typical value — refer to current specification sheet
Lower / Upper flammability limit	Non-applicable
Particle Characteristics	
Median equivalent diameter	Typical value — refer to current specification sheet

Molecular weight: 84.08 g/mol. Values are typical literature/specification values for this well-characterised commercial grade; minor batch-to-batch variation is normal.

9.2 Other information:

Explosive properties	Not explosive
Oxidising properties	Not oxidising
Corrosive to metals	Not corrosive
Heat of combustion	Typical value — refer to current specification sheet
Surface tension at 20°C	Not relevant (solid)
Refraction index	Not relevant

SECTION 10: STABILITY AND REACTIVITY

- 10.1 Reactivity:**
Stable under normal conditions of use. Reacts with strong acids and strong bases (hydrolysis); may polymerise/condense with formaldehyde and related reagents under process conditions (intended reactive use).
- 10.2 Chemical stability:**
Chemically stable under the indicated conditions of storage, handling and use.
- 10.3 Possibility of hazardous reactions:**
No hazardous reactions expected under normal use and storage conditions, other than the intended process reactions (e.g. resin curing) conducted under controlled conditions.
- 10.4 Conditions to avoid:**

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	No specific hazard	Avoid temperatures near/above melting point (decomposition)	No specific hazard	Avoid prolonged dampness

10.5 Incompatible materials:

Strong Acids	Strong Oxidisers	Strong Bases
Avoid contact (hydrolysis)	Avoid contact	Avoid contact (hydrolysis)

- 10.6 Hazardous decomposition products:**
On strong thermal decomposition/combustion: oxides of nitrogen, ammonia and, under incomplete-combustion conditions, trace hydrogen cyanide.

SECTION 11: TOXICOLOGICAL INFORMATION

- 11.1 Information on toxicological effects:**
Dicyandiamide is of very low acute toxicity. In case of exposure that is repetitive, prolonged, or at concentrations higher than the recommended occupational exposure limits, adverse health effects may result depending on the means of exposure:
- A. Ingestion (acute effect):**
Very low toxicity. Large doses may cause mild gastrointestinal discomfort.
- B. Inhalation (acute effect):**
Dust may cause mechanical irritation of the respiratory tract.
- C. Contact with skin and eyes (acute effect):**
Not generally irritating to skin under normal handling. Causes serious eye irritation (H319).
- D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity):**
Classification criteria are not met based on available data. Not listed by IARC.
- E. Sensitizing effects:**
Classification criteria for respiratory or skin sensitisation are not met based on available data.
- F. Specific target organ toxicity (STOT) – single exposure:**
Classification criteria are not met based on available data.
- G. Specific target organ toxicity (STOT) – repeated exposure:**
Classification criteria are not met based on available data.
- H. Aspiration hazard:**
Not relevant (solid).
- Product-specific toxicological information:**

Identification	Acute Toxicity	Genus
Dicyandiamide CAS: 461-58-5	LD50 oral: > 5000 mg/kg	Rat
	LD50 dermal: > 2000 mg/kg	Rabbit

SECTION 12: ECOLOGICAL INFORMATION

Not classified as hazardous to the aquatic environment under GHS criteria based on available data.

12.1 Toxicity:

Identification	Acute Toxicity	Species	Genus
Dicyandiamide CAS: 461-58-5	LC50: > 100 mg/L (96h)	Non-applicable	Fish
	EC50: > 100 mg/L (48h)	Non-applicable	Crustacean

12.2 Persistence and degradability:

Used deliberately as a nitrification inhibitor in soil owing to its slow biodegradation relative to urea/ammonium fertiliser nitrogen; ultimately degrades via soil micro-organisms over weeks.

12.3 Bioaccumulative potential:

Low potential (log Pow ≈ -1.4); not expected to bioaccumulate.

12.4 Mobility in soil:

Koc	Henry	Dry Soil	Moist Soil
Low (polar, water-soluble)	Low	Mobile	Mobile

12.5 Results of PBT and vPvB assessment:

Does not meet PBT/vPvB criteria based on available data.

12.6 Other adverse effects:

Not described. Widely used as an agricultural nitrification inhibitor.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Disposal methods:

Recover for reuse where possible. Non-hazardous waste; dispose of via an authorised waste contractor in accordance with local regulations.

Refer to national and local regulations on waste management. In India, dispose of in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, as amended, through an authorised waste handler/recycler, or as advised by the State Pollution Control Board.

SECTION 14: TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR 2023 / RID 2023 principles, as adapted for India):

14.1 UN number	Not assigned – not a dangerous good
14.2 UN proper shipping name	Non-applicable
14.3 Transport hazard class(es)	Not classified
14.4 Packing group	N/A
14.5 Environmental hazard	No
14.6 Special precautions for user	Non-hazardous for transport; physico-chemical properties: see section 9
14.7 Transport in bulk	Permitted subject to standard bulk-solid handling practice

Transport of dangerous goods by sea (IMDG):

14.1 UN number	Not assigned – not a dangerous good
14.2 UN proper shipping name	Non-applicable
14.3 Transport hazard class(es)	Not classified
14.4 Packing group	N/A
14.5 Marine pollutant	No
14.6 Special precautions for user	Non-hazardous for transport
14.7 Transport in bulk	Permitted subject to standard bulk-solid handling practice

Transport of dangerous goods by air (IATA/ICAO):

14.1 UN number	Not assigned – not a dangerous good
14.2 UN proper shipping name	Non-applicable
14.3 Transport hazard class(es)	Not classified
14.4 Packing group	N/A
14.5 Environmental hazard	No
14.6 Special precautions for user	Non-hazardous for transport
14.7 Transport in bulk	Permitted subject to standard bulk-solid handling practice

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations specific for the product in question:

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of local circumstances, in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product.

Other legislation (India):

Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (as amended)
The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996
Public Liability Insurance Act, 1991
Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

SECTION 16: OTHER INFORMATION

Legislation related to safety data sheets:

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3:

H319: Causes serious eye irritation.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training:

Minimal training is recommended to prevent industrial risks for staff using this product, in order to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources:

United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS); European Chemicals Agency (ECHA) Classification & Labelling Inventory; United Nations Recommendations on the Transport

of Dangerous Goods (Model Regulations).

Abbreviations and acronyms:

ADR: European agreement concerning the international carriage of dangerous goods by road | IMDG: International maritime dangerous goods code | IATA: International Air Transport Association | ICAO: International Civil Aviation Organisation | PG: Packing Group | BCF: Bioconcentration factor | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | Log-Pow: Octanol-water partition coefficient | IARC: International Agency for Research on Cancer | STOT SE/RE: Specific Target Organ Toxicity, Single/Repeated Exposure | PBT/vPvB: Persistent, Bioaccumulative and Toxic / very Persistent, very Bioaccumulative

The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

END OF SAFETY DATA SHEET