Safety Data Sheet

For INDIA, According to GHS (Rev. 8)

AMMONIA SOLUTION (23% NH3, AQUEOUS)

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SECTION 1: IDENTIFICATION

1.1 GHS Product identifier:

AMMONIA SOLUTION (23% NH_3, AQUEOUS)
Aqua ammonia; Ammonium hydroxide solution
CAS: 1336-21-6

Other means of identification:

Not relevant

1.2 Recommended use of the chemical and restrictions on use:

Relevant uses: Water treatment (pH adjustment, chlorine/chloramine disinfection), fertiliser and chemical intermediate, cleaning agent, textile/dyeing auxiliary, pH control in industrial processes. 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
No 92, Govindappa Naicken Street, Shiva Complex, Chennai – 600001, Tamil Nadu, India
Tel: +91 - 7092722822, +91 - 9840284032 / +91 - 44 - 25393652, 42130281
Email: sales@surajchemicals.com | Website: www.surajchemicals.com
GST No: 33ACEPV8190L1ZZ

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), based on the concentration-dependent harmonised classification for aqueous ammonia solutions (10% – <25% NH_3).

Skin Irrit. 2	Skin irritation, Category 2, H315
Eye Dam. 1	Serious eye damage, Category 1, H318
STOT SE 3	Respiratory tract irritation, single exposure, Category 3, H335
Aquatic Acute 1	Hazardous to the aquatic environment, acute hazard, Category 1, H400

2.2 GHS label elements, including precautionary statements:

GHS: Danger

Hazard statements:

Skin Irrit. 2: H315 – Causes skin irritation.
Eye Dam. 1: H318 – Causes serious eye damage.
STOT SE 3: H335 – May cause respiratory irritation.
Aquatic Acute 1: H400 – Very toxic to aquatic life.

Precautionary statements:

P261: Avoid breathing vapours/mist.
P264: Wash hands thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352: IF ON SKIN: Wash with plenty of water.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a doctor.
P321: Specific treatment (see supplemental first aid instructions).
P332+P313: If skin irritation occurs: Get medical advice/attention.
P362+P364: Take off contaminated clothing and wash it before reuse.
P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P501: Dispose of the contents/containers in accordance with regulations on hazardous waste.

2.3 Other hazards which do not result in classification:

Releases pungent ammonia gas readily, especially on warming or agitation – asphyxiation risk from displacement of oxygen in confined/poorly ventilated spaces. Reacts with halogens and some metals to liberate flammable/toxic gases – see section 10.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances:

Chemical description: Ammonia solution, 23% w/w NH_3 in water

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

Identification	Chemical Name / Classification	Concentration
CAS: 1336-21-6	Ammonia solution — Skin Irrit. 2: H315; Eye Dam. 1: H318; STOT SE 3: H335; Aquatic Acute 1: H400 – Danger	23% w/w (as NH_3)
CAS: 7732-18-5	Water – Not classified	Balance (~77%)

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

3.2 Mixtures:

This product is an aqueous solution of ammonia gas (see 3.1); composition is not further variable as a mixture.

SECTION 4: FIRST AID MEASURES

4.1 Description of necessary first-aid measures:

Request medical assistance immediately, showing the SDS of this product.

By inhalation:

Remove the person affected from the area of exposure immediately, provide fresh air and keep at rest. Ammonia vapour is corrosive/irritant to the respiratory tract; in serious cases (breathing difficulty, pulmonary oedema) seek immediate medical assistance and administer oxygen if trained to do so.

By skin contact:

Remove contaminated clothing and footwear immediately, flush skin with plenty of water for at least 15 minutes. Seek medical attention – concentrated contact can cause chemical burns.

By eye contact:

Rinse eyes thoroughly with lukewarm water for at least 20 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Seek immediate medical/ophthalmological attention – risk of serious eye damage.

By ingestion/aspiration:

Do NOT induce vomiting. Rinse the mouth with water; if conscious, give water or milk to drink. Seek immediate medical attention, showing this SDS.

4.2 Most important symptoms/effects, acute and delayed:

Acute and delayed effects are indicated in sections 2 and 11.

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

Treat as a corrosive/irritant chemical exposure; manage airway and monitor for delayed pulmonary oedema following significant inhalation exposure.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media:

Suitable: Water spray/fog, foam, dry chemical powder, carbon dioxide – suit surrounding fire (product itself is non-flammable)
Unsuitable: None known

5.2 Specific hazards arising from the chemical:

Non-flammable aqueous solution. On heating, releases ammonia gas, which is flammable within a narrow range (16–25% vol. in air) and toxic/corrosive. Reaction with oxidizers (e.g. chlorine, hypochlorites) can generate toxic gases (chloramines, nitrogen trichloride).

5.3 Special protective actions for fire-fighters:

Evacuate all non-essential personnel. Intervention only by capable personnel who are trained and aware of the hazards of the product. Wear self-contained breathing apparatus and full protective chemical-resistant clothing. After intervention, decontaminate thoroughly.

Additional provisions:

Cool fire-exposed containers with water spray from a safe distance, approaching from upwind. Contain fire-fighting water/runoff to prevent environmental release.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel:

Evacuate the area and ventilate; ammonia vapour is a respiratory/eye irritant and can displace oxygen in confined spaces. Isolate leaks only with appropriate PPE and respiratory protection (see section 8).

For emergency responders:

Wear self-contained breathing apparatus and chemical-resistant protective clothing. Keep unprotected persons away and upwind. See section 8.

6.2 Environmental precautions:

Very toxic to aquatic life – prevent release to drains, watercourses or soil. Contain spillage; dilute large releases with copious water only under controlled conditions (with approval, since dilution water itself becomes contaminated). Notify the relevant authority in case of significant environmental release.

6.3 Methods and materials for containment and cleaning up:

Contain the spill with bunding; absorb with inert non-combustible absorbent material and place in a labelled, closed, corrosion-resistant container for disposal. Ventilate the area thoroughly after clean-up. Do not allow to enter sewers/waterways.

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:

Handle in well-ventilated areas with local exhaust ventilation. Use appropriate PPE (section 8). Avoid contact with skin, eyes and clothing. Do not mix with chlorine, hypochlorites or other oxidizers/acids – risk of toxic gas evolution.

B. Technical recommendations for the prevention of fires and explosions:

Keep away from heat sources (risk of ammonia gas release and, in confined spaces, flammable vapour accumulation). Use bonding/grounding for bulk transfer operations; provide adequate ventilation.

C. Technical recommendations on general occupational hygiene:

Do not eat or drink during the process; wash hands afterwards with suitable cleaning products.

D. Technical recommendations to prevent environmental risks:

Provide tight electrical equipment well protected against corrosion. Avoid atmospheric emissions. Warn people about the dangers of the product. Follow the protective measures given in the exposure controls/personal protection section. In industrial installations, apply the rules for the prevention of major accidents (consult an expert).

7.2 Conditions for safe storage, including any incompatibilities:

A. Specific storage requirements:

Minimum Temp.	5°C
Maximum Temp.	30°C (cool storage reduces vapour/pressure build-up)
Maximum time	12 Months in original sealed, vented packaging

B. General conditions for storage:

Store in a cool, dry, well-ventilated area, away from heat, acids, oxidizers (chlorine, hypochlorites) and incompatible metals (copper, brass, zinc, aluminium alloys), in tightly closed but appropriately vented corrosion-resistant containers. Provide secondary containment/bunding. For additional information see subsection 10.5.

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:

Substances whose occupational exposure limits have to be assessed in the workplace, per the Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987):

Identification	Occupational Exposure Limit Type	Value
Ammonia CAS: 7664-41-7 (as NH_3)	ACGIH TLV – TWA (8 hrs)	25 ppm
	ACGIH TLV – STEL (15 min)	35 ppm

8.2 Appropriate engineering controls:

It is recommended to use localized extraction in the work area as a collective protection measure to avoid exceeding occupational exposure limits, in addition to individual protective equipment (PPE) as needed. Consult the manufacturer's information leaflet for storage, use, cleaning and maintenance of PPE.

B. Respiratory protection:

Full-face respirator with ammonia-rated (type K/NH_3) cartridge for elevated concentrations; self-contained breathing apparatus for spills, confined spaces or concentrations above the cartridge's rated limit.

C. Specific protection for the hands:

Chemical-resistant gloves (e.g. nitrile, neoprene, PVC).

D. Eye and face protection:

Full face shield plus chemical splash goggles (product causes serious eye damage).

E. Bodily protection:

Chemical-resistant apron/clothing and boots for prolonged or 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.

Environmental exposure controls:

Avoid environmental spillage of both the product and its container. See subsection 7.1.D.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Appearance	
Physical state at 20°C	Liquid
Appearance	Clear, mobile liquid, fumes in air
Color	Colorless
Odor	Sharp, pungent (ammoniacal)
Odour threshold	~5–50 ppm (as NH_3, approx.)
Volatility	
Boiling point at atmospheric pressure	~38–40°C (23% solution, approx.)
Vapour pressure at 20°C	~50–60 kPa (approx., mainly NH_3 partial pressure)
Evaporation rate at 20°C	Rapid (releases NH_3 gas readily)
Product Description	
Density / Relative density at 20°C	~0.910–0.915 g/cm³
Dynamic / Kinematic viscosity at 20°C	~1.3 mPa·s
Concentration	23% w/w (as NH_3)
pH (aqueous solution)	~11.5–12 (strongly alkaline)
Vapour density (air = 1)	<1 (NH_3 vapour lighter than air; mixed vapour above solution ~0.6–0.8)
Partition coefficient n-octanol/water (log Pow)	-1.14 (ammonia)
Solubility in water at 20°C	Miscible in all proportions
Decomposition temperature	Not relevant (releases NH_3 gas on heating; does not decompose chemically)
Melting point/freezing point	~-58°C (approx., 23% solution)
Flammability	
Flash Point	Non-applicable (aqueous solution; not flammable as supplied)
Flammability (solid, gas)	Non-applicable (liquid); evolved NH_3 gas is flammable within a narrow range
Autoignition temperature	~651°C (ammonia gas)
Lower / Upper flammability limit	~16% / 25% (vol. in air, for evolved NH_3 gas; narrow flammable range)
Particle Characteristics	
Median equivalent diameter	Non-applicable (liquid)

Values are typical literature/reference values for a 23% w/w aqueous ammonia solution and may vary slightly by batch/temperature.

9.2 Other information:

Explosive properties	Not classified as explosive; evolved ammonia gas/air mixtures are flammable within a narrow range
Oxidising properties	Not an oxidizer
Corrosive to metals	Corrosive to copper, brass, zinc, aluminium and their alloys; not significantly corrosive to steel/stainless steel
Heat of combustion	Not relevant (aqueous solution, non-flammable as supplied)
Surface tension at 20°C	~55–60 mN/m (approx.)
Refraction index	~1.36 (approx.)

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity:

Reacts with acids (exothermic neutralisation), halogens/hypochlorites (forms toxic chloramines/nitrogen trichloride), and readily attacks/corrodes copper, brass, zinc, aluminium and their alloys (forms complex ions).

10.2 Chemical stability:

Chemically stable under the indicated conditions of storage, handling and use; releases ammonia gas progressively, especially on warming, agitation or pressure reduction.

10.3 Possibility of hazardous reactions:

Mixing with chlorine-based oxidizers (bleach, hypochlorites) generates toxic chloramine gases – never mix. Reaction with strong acids is exothermic. Contact with incompatible metals generates flammable hydrogen gas over time in some conditions and causes corrosion.

10.4 Conditions to avoid:

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	Releases NH_3 gas on contact with open air	Avoid heat – increases vapour pressure/gas release	Not applicable	Not applicable (aqueous)

10.5 Incompatible materials:

Halogens/Hypochlorites	Strong Acids	Copper/Brass/Zinc/Aluminium
Avoid contact – toxic chloramine/NCl_3 gas formation	Avoid contact – vigorous exothermic neutralisation	Avoid contact – corrosion/complexation

10.6 Hazardous decomposition products:

Ammonia gas and, on combustion/strong oxidation, oxides of nitrogen.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

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):

Causes corrosive burns to the mouth, throat and gastrointestinal tract due to alkaline pH; not classified under acute oral toxicity numerical criteria but corrosive/damaging in effect.

B. Inhalation (acute effect):

Ammonia vapour is a severe respiratory and mucous membrane irritant; may cause respiratory irritation (H335), coughing, and at high concentration, chemical burns to the airway and pulmonary oedema.

C. Contact with skin and eyes (acute effect):

Causes skin irritation (H315) and serious eye damage (H318); concentrated contact or prolonged exposure can cause chemical burns.

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity):

Classification criteria for carcinogenicity, mutagenicity and reproductive toxicity are not met based on available data. IARC: Not classified.

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:

May cause respiratory irritation (H335) at vapour concentrations above the occupational exposure limit.

G. Specific target organ toxicity (STOT) – repeated exposure:

Classification criteria are not met based on available data; repeated overexposure to ammonia vapour may aggravate pre-existing respiratory conditions.

H. Aspiration hazard:

Not applicable (aqueous solution).

Product-specific toxicological information:

Identification	Acute Toxicity	Genus
Ammonia solution (23% NH_3) CAS: 1336-21-6	LD50 oral: ~350–750 mg/kg (as NH_3, estimate for ~25–28% solution)	Rat
	LD50 dermal: >2000 mg/kg (estimate)	Rabbit
	LC50 inhalation: ~2000 ppm (4h, as NH_3 gas)	Rat

SECTION 12: ECOLOGICAL INFORMATION

Very toxic to aquatic life.

12.1 Toxicity:

Identification	Acute Toxicity	Species	Genus
Ammonia (as NH_3) CAS: 7664-41-7	LC50: ~0.2–2.0 mg/L (96h, pH/temperature dependent)	Oncorhynchus mykiss	Fish
	EC50: ~0.66 mg/L (48h)	Daphnia magna	Crustacean

12.2 Persistence and degradability:

Readily oxidised/nitrified in the environment (natural nitrogen cycle) but very toxic to aquatic organisms, particularly fish, at low concentrations especially at higher pH/temperature (un-ionised NH_3 fraction).

12.3 Bioaccumulative potential:

Low bioaccumulation potential (log Pow -1.14; highly water-soluble, rapidly metabolised/excreted by organisms).

12.4 Mobility in soil:

Koc	Henry	Dry Soil	Moist Soil
Low; adsorbs to soil cation-exchange sites as NH_4^+	~3.3×10^{-5} atm·m³/mol	Volatilises as NH_3 gas	Mobile, may nitrify/leach as nitrate

12.5 Results of PBT and vPvB assessment:

Not persistent (rapidly cycled in the environment); does not meet the P/B criteria of Annex XIII despite high acute aquatic toxicity (T criterion met).

12.6 Other adverse effects:

Contributes to eutrophication (nitrogen loading) if released in large quantities to surface water.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Disposal methods:

Do not discharge directly to drains, watercourses or soil. Neutralise with dilute acid under controlled conditions or dispose of via a licensed hazardous waste/wastewater treatment contractor, in accordance with local regulations. For packaging: rinse residues under ventilated conditions before disposal/recycling.

Refer to national and local regulations on waste management, including the Hazardous and Other Wastes (Management and Transboundary Movement) Rules.

SECTION 14: TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR 2023 / RID 2023):

14.1 UN number	UN2672
14.2 UN proper shipping name	AMMONIA SOLUTION, RELATIVE DENSITY BETWEEN 0.880 AND 0.957 AT 15°C IN WATER, WITH MORE THAN 10% BUT NOT MORE THAN 35% AMMONIA
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazard	No
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by sea (IMDG 41-22):

14.1 UN number	UN2672
14.2 UN proper shipping name	AMMONIA SOLUTION, RELATIVE DENSITY BETWEEN 0.880 AND 0.957 AT 15°C IN WATER, WITH MORE THAN 10% BUT NOT MORE THAN 35% AMMONIA
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Marine pollutant	No
14.6 Special precautions for user	EmS Codes: F-A, S-B | Limited quantities: 5 L | Segregation group: Not relevant
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by air (IATA/ICAO 2024):

14.1 UN number	UN2672
14.2 UN proper shipping name	AMMONIA SOLUTION, RELATIVE DENSITY BETWEEN 0.880 AND 0.957 AT 15°C IN WATER, WITH MORE THAN 10% BUT NOT MORE THAN 35% AMMONIA
14.3 Transport hazard class(es)	8
14.4 Packing group	III
14.5 Environmental hazard	No
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

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:

Manufacture, Storage and Import of Hazardous Chemicals Rules 1989
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

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:

H315: Causes skin irritation.
H318: Causes serious eye damage.
H335: May cause respiratory irritation.
H400: Very toxic to aquatic life.

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:

PubChem (National Library of Medicine); European Chemicals Agency (ECHA) classification and labelling inventory; United Nations Economic Commission for Europe (UNECE) Model Regulations; ACGIH Threshold Limit Values.

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 | COD: Chemical Oxygen Demand | BOD5: 5-day biochemical oxygen demand | BCF: Bioconcentration factor | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | Log-POW: Octanol-water partition coefficient | Koc: Partition coefficient of organic carbon | IARC: International Agency for Research on Cancer

END OF SAFETY DATA SHEET