Safety Data Sheet

Issue Date: 01-Jul-2024 **Revision Date:** 01-Jul-2024 **Version** 1

1. IDENTIFICATION

Product identifier

Product Name Ammonia

Other means of identification

SDS # EF-100

Synonyms Anhydrous ammonia.

UN/ID No UN1005

Recommended use of the chemical and restrictions on use

Recommended Use Scientific research and development. Semiconductor Purposes. Manufacture of substances.

Details of the supplier of the safety data sheet

Supplier Address

EFC Gases & Advanced Materials
3266 Bergey Road
Hatfield, PA 19440
Email: efcsafety@efcgases.com

Emergency telephone number

Company Phone Number 215-443-9600

Emergency Telephone INFOTRAC 1-352-323-3500 (International)
1-800-535-5053 (North America)

2. HAZARDS IDENTIFICATION

Appearance Clear, colorless gas **Physical state** Gas **Odor** Pungent Ammoniacal

Classification

Acute toxicity - Inhalation (Gases)	Category 4
Skin corrosion/irritation	Category 1 Sub-category B
Serious eye damage/eye irritation	Category 1
Flammable gases	Category 2
Gases under pressure	Liquefied gas

Signal Word

Danger

Hazard statements

Harmful if inhaled
Causes severe skin burns and eye damage
Flammable gas
Contains gas under pressure; may explode if heated

Precautionary Statements - Prevention
Use only outdoors or in a well-ventilated area
Do not breathe dusts or mists
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep away from heat/sparks/open flames/hot surfaces. — No smoking

Precautionary Statements - Response
Immediately call a POISON CENTER or doctor
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower
Wash contaminated clothing before reuse
Eliminate all ignition sources if safe to do so
IF INHALED: Remove person to fresh air and keep comfortable for breathing
Immediately call a POISON CENTER or doctor
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
LEAKING GAS FIRE: Do not extinguish, unless leak can be stopped safely

Precautionary Statements - Storage
Store locked up
Protect from sunlight. Store in a well-ventilated place

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Other hazards
Very toxic to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Anhydrous ammonia.

Chemical name	CAS No	Weight-%
Ammonia, anhydrous	7664-41-7	80-100

If Chemical Name/CAS No is "proprietary" and/or Weight-% is listed as a range, the specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

Description of first aid measures

Eye Contact Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

Skin Contact Thaw frosted parts with lukewarm water. Do not rub affected area. Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Get immediate medical advice/attention.

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Apply artificial respiration with bag and mask if breathing stopped. Get immediate medical advice/attention.

Ingestion Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed

Symptoms Harmful if inhaled. Corrosive to the respiratory tract. May cause frostbite. Causes severe skin burns and eye damage.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Do not use water jet to extinguish.

Specific Hazards Arising from the Chemical
This product is flammable. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form flammable/explosive vapor-air mixture.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Ensure adequate ventilation. Wear protective equipment consistent with the site emergency plan. Evacuate personnel to a safe area. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

For Emergency Responders Standard protective clothing and equipment (e.g, Self-Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection. Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

Environmental precautions

Environmental precautions Try to stop release if without risk. See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Clean-Up Dispose of contents/container to an approved waste disposal plant.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on Safe Handling Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. Handle empty containers with care because residual vapors are flammable. In use, may form flammable vapor-air mixture. Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Conditions Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well-ventilated area. Store locked up.

Incompatible Materials Oxidizing materials. Air.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Ammonia, anhydrous 7664-41-7	STEL: 35 ppm TWA: 25 ppm	TWA: 50 ppm TWA: 35 mg/m^3 (vacated) STEL: 35 ppm (vacated) STEL: 27 mg/m^3	IDLH: 300 ppm TWA: 25 ppm TWA: 18 mg/m^3 STEL: 35 ppm STEL: 27 mg/m^3

Appropriate engineering controls

Engineering Controls Apply technical measures to comply with the occupational exposure limits.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Refer to 29 CFR 1910.133 for eye and face protection regulations.

Skin and Body Protection Refer to 29 CFR 1910.138 for appropriate skin and body protection.

Respiratory Protection Refer to 29 CFR 1910.134 for respiratory protection requirements.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Gas		
Appearance	Clear, colorless gas	**Odor**	Pungent Ammoniacal
Color	Not determined	**Odor Threshold**	Not determined

Property	Values	Remarks • Method
pH	No data available	
Melting point / freezing point	No data available	

Property	Values	Remarks • Method
Initial boiling point and boiling range	-33.4 °C / -28.2 °F	
Flash point	No data available	
Evaporation Rate	Not determined	
Flammability (Solid, Gas)	Not determined	
Flammability Limit in Air		
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor Pressure	860	
Vapor Density	0.6	(Air=1)
Relative Density	Not determined	
Water Solubility	0.53 g/ml	
Solubility in other solvents	Not determined	
Partition Coefficient	Not determined	
Autoignition temperature	630 °C / 1,166 °F	
Decomposition temperature	Not determined	
Kinematic viscosity	Not determined	
Dynamic Viscosity	Not determined	
Explosive Properties	Not determined	
Oxidizing Properties	Not determined	

10. STABILITY AND REACTIVITY

Reactivity
Not reactive under normal conditions.

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Can form explosive mixture with air.

Conditions to Avoid
Keep out of reach of children.

Incompatible materials
Oxidizing materials. Air.

Hazardous decomposition products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Eye Contact Avoid contact with eyes.

Skin Contact Avoid contact with skin.

Inhalation Harmful if inhaled.

Ingestion Do not ingest.

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Ammonia, anhydrous 7664-41-7	= 350 mg/kg (Rat)	-	= 9850 mg/m^3 (Rat) 1 h = 13770 mg/m^3 (Rat) 1 h

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Please see section 4 of this SDS for symptoms.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation Causes severe skin burns.

Serious eye damage/eye irritation Causes severe eye damage.

Carcinogenicity Based on the information provided, this product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document

Gas 7,070.8309 ppm

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic life with long lasting effects.

Component Information

Chemical name	Algae/aquatic plants	Fish	Crustacea
Ammonia, anhydrous 7664-41-7		LC50: =0.44mg/L (96h, Cyprinus carpio) LC50: 0.26 - 4.6mg/L (96h, Lepomis macrochirus) LC50: =1.17mg/L (96h, Lepomis macrochirus) LC50: 0.73 - 2.35mg/L (96h, Pimephales promelas) LC50: =5.9mg/L (96h, Pimephales promelas) LC50: >1.5mg/L (96h, Poecilia reticulata) LC50: =1.19mg/L (96h, Poecilia reticulata)	LC50: =25.4mg/L (48h, Daphnia magna)

Persistence/Degradability

Not determined.

Bioaccumulation

There is no data for this product.

Mobility

Not determined

Other adverse effects

Not determined

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods

Disposal of Wastes Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Disposal should be in accordance with applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION

Note Please see current shipping paper for most up to date shipping information, including exemptions and special circumstances.

DOT

UN/ID No UN1005
Proper Shipping Name Ammonia, anhydrous
Transport hazard class(es) 2.3
Subsidiary Hazard Class 8

IATA

UN number or ID number UN1005
Proper Shipping Name Ammonia, anhydrous
Transport hazard class(es) 2.3
Subsidiary hazard class 8

IMDG

UN number or ID number UN1005
Proper Shipping Name Ammonia, anhydrous
Transport hazard class(es) 2.3
Subsidiary Hazard Class 8
Marine Pollutant This material may meet the definition of a marine pollutant

15. REGULATORY INFORMATION

International Inventories

Chemical name	TSCA	TSCA Inventory Status	DSL/NDSL	EINECS/ELINCS	ENCS	IECSC	KECL	PICCS	AIIC
Ammonia, anhydrous	X	ACTIVE	X	X	X	X	X	X	X

Legend:

TSCA *- United States Toxic Substances Control Act Section 8(b) Inventory*

DSL/NDSL *- Canadian Domestic Substances List/Non-Domestic Substances List*

EINECS/ELINCS *- European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances*

ENCS *- Japan Existing and New Chemical Substances*

IECSC *- China Inventory of Existing Chemical Substances*

KECL *- Korean Existing and Evaluated Chemical Substances*

PICCS *- Philippines Inventory of Chemicals and Chemical Substances*

AICS *- Australian Inventory of Chemical Substances*

US Federal Regulations

CERCLA

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Ammonia, anhydrous 7664-41-7	100 lb	100 lb	RQ 100 lb final RQ RQ 45.4 kg final RQ

SARA 313

Chemical name	CAS No	Weight-%	SARA 313 - Threshold Values %
Ammonia, anhydrous - 7664-41-7	7664-41-7	80-100	1.0

CWA (Clean Water Act)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Ammonia, anhydrous	100 lb			X

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Ammonia, anhydrous 7664-41-7	X	X	X

16. OTHER INFORMATION

NFPA	**Health hazards**	**Flammability**	**Instability**	**Special hazards**
	-	-	-	-
HMIS	**Health hazards**	**Flammability**	**Physical hazards**	**Personal Protection**
	-	-	-	Not determined

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Revision Note: New format

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet