

Safety Data Sheet

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

Product identifier:

Product name: Ammonia Gas

Product code (SDS NO): AG_Ammonia_Gas_USFJ-2

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses of the product: Production of semiconductor

Details of the supplier of the safety data sheet

Manufacturer/Supplier: Asahi Graphic Corporation

Address: KOHGA Bldg. 3F, 4-23-8 Ebisu, Shibuya-ku, Tokyo, 150-0013 Japan

Telephone number: +81-3-5424-3016

FAX: +81-3-5424-3018

Emergency telephone number: +81-3-5424-3016

Section 2. Hazards identification

GHS classification and label elements of the product

Classification of the substance or mixture

PHYSICAL AND CHEMICAL HAZARDS

Flammable gases: Category 1

Gases under pressure: Liquefied gas

HEALTH HAZARDS

Acute toxicity (Inhalation): Category 4

Skin corrosion/irritation: Category 1

Serious eye damage/eye irritation: Category 1

Respiratory sensitization: Category 1

Specific target organ toxicity – single exposure: Category 1 (central nervous system, respiratory system)

Specific target organ toxicity – repeated exposure: Category 1 (respiratory system)

ENVIRONMENT HAZARDS

Hazardous to the aquatic environment, short-term (acute): Category 3

(Note) GHS classification without description: Not classified/Classification not possible

Label elements



Signal word: Danger

HAZARD STATEMENT

H220 Extremely flammable gas

H280 Contains gas under pressure; may explode if heated

H332 Harmful if inhaled

H314 Causes severe skin burns and eye damage

H318 Causes serious eye damage

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

H370 Causes damage to organs (central nervous system, respiratory system)

H372 Causes damage to organs through prolonged or repeated exposure (respiratory system)

H402 Harmful to aquatic life

PRECAUTIONARY STATEMENT

Prevention

P273 Avoid release to the environment.

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

ASAHI GRAPHIC Ammonia Gas,Asahi Graphic Corporation,AG_Ammonia_Gas_USFJ-2,Jul/07/2023

- P260 Do not breathe dust/fume/gas/mist/vapors/spray.
- P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
- P284 In case of inadequate ventilation wear respiratory protection.
- P271 Use only outdoors or in a well-ventilated area.
- P264 Wash contaminated parts thoroughly after handling.
- P280 Wear protective gloves, protective clothing or face protection.
- P280 Wear eye protection/face protection.
- P270 Do not eat, drink or smoke when using this product.

Response

- P381 In case of leakage, eliminate all ignition sources.
- P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
- P321 Specific treatment is required.
- P314 Get medical advice/attention if you feel unwell.
- P310 Immediately call a POISON CENTER/doctor/physician.
- P312 Call a POISON CENTER/doctor/physician if you feel unwell.
- P308 + P311 IF exposed or concerned: Call a POISON CENTER/doctor/physician.
- P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician.
- P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
- P363 Wash contaminated clothing before reuse.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Storage

- P403 Store in a well-ventilated place.
- P405 Store locked up.
- P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Disposal

- P501 Dispose of contents/container in accordance with local/national regulation.

Specific Physical and Chemical hazards

- Contain flammable gas under pressure. Risk of explosion by heating or shock.

Section 3. Composition/information on ingredients

Mixture/Substance selection:

Substance

Ingredient name	CAS No.	Content (%)	Chemicals No, Japan
Ammonia	7664-41-7	>99.999	1-391

Note : The figures shown above are not the specifications of the product.

Components contributing to the hazard

Component(s) come under Deleterious Substance(s) list of Poisonous and Deleterious Substances Control Law, Japan

Applicable

Component(s) come under Labeling, etc. article of Industrial Safety and Health Act, Japan

Applicable

Component(s) come under Deliver of Documents, etc. article of Industrial Safety and Health Act, Japan

Applicable

Section 4. First-aid measures

Descriptions of first-aid measures

General measures

- Get medical advice/attention if you feel unwell.
- Immediately call a POISON CENTER/doctor/physician.
- Call a POISON CENTER/doctor/physician if you feel unwell.
- IF exposed or concerned: Call a POISON CENTER/doctor/physician.

IF INHALED

- Remove person to fresh air and keep comfortable for breathing.
- If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician.

IF ON SKIN (or hair)

- Take off immediately all contaminated clothing. Rinse skin with water or shower.
- If skin irritation occurs: Get medical advice/attention.

IF IN EYES

- Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists: Get medical advice/attention.

IF SWALLOWED

- Rinse mouth. Do NOT induce vomiting.
- Call a POISON CENTER/doctor/physician if you feel unwell.

Most important symptoms and effects, both acute and delayed

(Symptoms when inhalation or ingestion)

Burning sensation, Cough, Sore throat, Breathlessness

(Symptoms when skin and/or eye contact)

Pain, Blisters, Skin burns, Redness, Severe burns

Indication of any immediate medical attention and special treatment needed

Specific treatment is required.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

In case of fire, use water mist, foam, dry powder, CO2 to extinguish.

Unsuitable extinguishing media

Unsuitable extinguishing media data is not available.

Specific hazards arising from the substance or mixture

- Will form toxic nitrogen oxides upon combustion.
- Containers may explode when heated.

Advice for firefighters

Specific fire-fighting measures

- Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
- Evacuate non-essential personnel to safe area.
- In case of leakage, eliminate all ignition sources.
- Cool container with water spray.
- Apply water from a safe distance to cool and protect surrounding area.
- Prevent extinguishing water from entering sewers.

Special protective equipment and precautions for fire-fighters

- Wear fire resistant or flame retardant clothing.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Firefighters should wear self-contained breathing apparatus with a full facepiece operated in the positive pressure mode.

Section 6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

- Evacuate area.
- Keep unauthorized personnel away.
- Wear an air-supplied respirator for handling a spill at a poor ventilated workplace.
- Wear proper protective equipment.
- Eliminate all sources of ignition and ventilate the area.

Environmental precautions

- Prevent spills from entering sewers, watercourses or low areas.
- If flown out into rivers, contact competent authorities.

Methods and materials for containment and cleaning up

- Use clean non-sparking tools to collect absorbed material.
- All equipment used when handling the product must be grounded.

Preventive measures for secondary accident

- Stop leak if safe to do so.

Section 7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

- Do not breathe dust/fume/gas/mist/vapors/spray.
- Avoid breathing dust/fume/gas/mist/vapors/spray.

(Protective measures against fire and explosion)

- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Ground and bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use non-sparking tools.
- Take action to prevent static discharges.

(Exhaust/ventilator)

- Exhaust/ventilator should be available.

(Safety treatments)

- Avoid contact with skin.
- Avoid contact with eyes.

Safety Measures

- Use only outdoors or in a well-ventilated area.
- Wear protective gloves, protective clothing or face protection.
- Wear eye protection/face protection.

Any incompatibilities

- Acids, Oxidizing agents, Alcohols, Metals should not be mixed with the chemicals.

Advice on general occupational hygiene

- Do not get in eyes, on skin, or on clothing.
- Wash contaminated parts thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Wash contaminated clothing before reuse.
- Wash hands thoroughly after handling.

Storage

Conditions for safe storage

- Store in a well-ventilated place. Keep container tightly closed. Keep cool.
- Store locked up.
- Protect from sunlight. Store in a well-ventilated place.

Container and packaging materials for safe handling data is not available.

Section 8. Exposure controls/personal protection

Control parameters

Control value in MHLW is not available.

Adopted value

JSOH(1979) 25ppm; 17mg/m³

ACGIH(1976) TWA: 25ppm;

STEL: 35ppm (Eye dam; URT irr)

OSHA-PEL

TWA: 50ppm, 35mg/m³

NIOSH-REL

TWA: 25ppm; STEL 35ppm

Exposure controls

Appropriate engineering controls

Exhaust/ventilator should be available.

Eye wash station should be available.

Washing facilities should be available.

Individual protection measures

Respiratory protection

Wear respiratory protection.

Hand protection

Wear protective gloves. Recommended material(s): impermeable or chemical resistant rubber

Eye protection

Wear safety glasses with side-shields or chemical safety goggle.

Skin and body protection

Wear face protection (as specified by the manufacturer/supplier or the competent authority).

Wear protective clothing.

Wear impervious clothing and boots in case of repeated or prolonged treatment.

Section 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Gas (Liquefied gas)

Color: Colorless

Odor: Irritant odor

Odor threshold data is not available.

Melting point/Freezing point: -77.7°C

Boiling point or initial boiling point: -33.3°C

Boiling range data is not available.

Flammability (gases, liquids and solids): Flammable

Lower and upper explosion limit/flammability limit:

Lower explosion limit: 15.4vol %

Upper explosion limit: 33.6vol %

Flash point: Not applicable

Auto-ignition temperature: 630°C

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water: 540g/liter (20°C)

Solubility in solvent data is not available.

n-Octanol/water partition coefficient: log Pow-1.14

Vapor pressure: 1013kPa (26°C)

Density and/or relative density: 0.7 (-33°C)

Relative vapor density (Air=1): 0.6

Particle characteristics: Not applicable

Section 10. Stability and Reactivity

Reactivity

Reactivity data is not available.

Chemical stability

Stable under normal storage/handling conditions.

Possibility of hazardous reactions

May form explosive vapor-air mixtures.

Conditions to avoid

Conditions to avoid data is not available.

Incompatible materials

Acids, Oxidizing agents, Alcohols, Metals

Hazardous decomposition products

The following substances are produced by pyrolysis.

Nitrogen oxides

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Acute toxicity (Dermal)

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Acute toxicity (Inhalation)

[Product]

Category 4, Harmful if inhaled

[Data for components of the product]

[GHS Cat. Japan, base data]

gas: rat LC50=7679ppm/4hr (EHC 54, 1986)

Irritant properties

Skin corrosion/irritation

[Product]

Category 1, Causes severe skin burns and eye damage

[Data for components of the product]

[GHS Cat. Japan, base data]

severe burns (DFGOT vol. 6, 1994)

Serious eye damage/irritation

[Product]

Category 1, Causes serious eye damage

[Data for components of the product]

[GHS Cat. Japan, base data]

severe necrosis (DFGOT vol. 6, 1994)

Sensitization

Respiratory sensitization

[Product]

Category 1, May cause allergy or asthma symptoms or breathing difficulties if inhaled

[Data for components of the product]

[GHS Cat. Japan, base data]

cat. 1; ATSDR, 2004

Skin sensitization

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Germ cell mutagenicity

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Carcinogenicity

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Reproductive toxicity

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Specific target organ toxicity (STOT)

STOT-single exposure

[Product]

Category 1, Causes damage to organs

[Data for components of the product]

[cat.1]

[GHS Cat. Japan, base data]

central nervous system, respiratory system (ATSDR, 2004)

STOT-repeated exposure

[Product]

Category 1, Causes damage to organs through prolonged or repeated exposure

[Data for components of the product]

[cat.1]

[GHS Cat. Japan, base data]

respiratory system (ATSDR, 2004)

Aspiration hazard

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Section 12. Ecological Information

Toxicity

Aquatic toxicity

[Product]

Category 3, Harmful to aquatic life

[Data for components of the product]

Hazardous to the aquatic environment, short-term (acute)

[GHS Cat. Japan, base data]

Fish (*Oncorhynchus mykiss*) LC50=13.0mg/L/96hr as total ammonia (Test substance: NH4Cl, pH: 8.29) (Thurston et al., 1981)

Hazardous to the aquatic environment, long-term (chronic)

[GHS Cat. Japan, base data]

Crustacea (*Mysidopsis bahia*) NOEC=3.47mg/L/32days as total ammonia, (Test substance: NH4Cl pH: 7.92-8.01) (SIDS, 2007)

Water solubility

54 g/100 ml (20°C) (ICSC, 2013)

Persistence and degradability

[Data for components of the product]

Rapidly degradable (readily converted to nitrate in an aqueous environment (SIDS, 2007))

Bioaccumulative potential

[Data for components of the product]

log Kow=-1.14 (SIDS, 2007)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

Section 13. Disposal considerations

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging

Waste treatment methods

Avoid release to the environment.

Dispose of contents/container in accordance with local/national regulation.

Contaminated packing

Data is not available.

Section 14. Transport Information

UN No., UN CLASS

UN Number or ID Number : 1005

UN Proper Shipping Name :

AMMONIA, ANHYDROUS

Class or division (Transport hazard class) : 2.3

Subsidiary hazard(s) : 8

Packing group : Not regulated

ERG GUIDE No.: 125

Special provisions No.: 23; 379

IMDG Code (International Maritime Dangerous Goods Regulations)

UN Number or ID Number : 1005
UN Proper Shipping Name :
AMMONIA, ANHYDROUS
Class or division (Transport hazard class) : 2.3
Subsidiary hazard(s) : 8
Packing group : Not regulated
Special provisions No.: 23; 379

IATA (Dangerous Goods Regulations)

UN Number or ID Number : 1005
UN Proper Shipping Name :
AMMONIA, ANHYDROUS
Class or division (Transport hazard class) : 2.3
Subsidiary hazard(s) : 8
Packing group : Not regulated
Special provisions No.: A2

Environmental hazards

Marine pollutants (yes/no) : yes

Special precautions for user

Special precautions for user is not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

This product is not intended to be carried in bulk.

Rules and regulations on domestic transport

Ship Safety Act
Class 2 : Gases—Division 2.3 Toxic gases
Civil Aeronautics Act
Prohibited

Section 15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Poisonous and Deleterious Substances Control Law, Japan

Deleterious Substances (Attached Table 2)

Applicable 100% (Cabinet order number 4)

Industrial Safety and Health Act, Japan

Specified Substances Gr.3

Applicable

The product is not applicable to Organic Solvent Ordinance, Japan

Chemical Substances requiring Labeling and Deliver of Documents, etc.

Labeling, etc.

Applicable (Attached table 9-39)

Report required substances

Applicable (Attached table 9-39)

Appended Table 1 Dangerous Substances (related to Article 1, 6, and 9-3)

Flammable gases

Corrosive liquids

Applicable

PRTR law, Japan

The product is not applicable to Pollutant Release and Transfer Register (PRTR) law, Japan

Labor Standards Act, Japan

Chemical substances or compounds (including alloys) causing disease (Regulation, Appended Table 1-2-4-1)

Applicable

Fire Service Act, Japan

Fire fighting inhibitor need a notification

Regulation on dangerous substance attached table-2: Deleterious Substances (quantity 200kg)

Ammonia

High Pressure Gas Safety Act, Japan

Liquefied gas : Pressure (at service temperature, or 35°C) =>0.2MPa

Not applicable to Specified Chemical Substances, Monitoring Chemical Substances or Priority Assessment Chemical Substances of Chemical Substances Control Law, Japan.

Offensive Odor Control Law, Japan

Applicable Cabinet Order number 1 : Site boundary line tolerance 1.0 – 5.0 ppm

Air Pollution Control Law, Japan

Specific substances

Applicable(Cabinet order 10-1)

Water Pollution Control Law, Japan

Hazardous substance(s)

Applicable Act No. 26: 100mg-(Ammoniacal nitrogen x 0.4 + Nitrite nitrogen + Nitrate nitrogen)/liter

U.S. Toxic Substances Control Act (TSCA) Inventory

Chemicals listed in TSCA Inventory

Applicable

Superfund Amendments and Reauthorizations Act (SARA), Title III

SARA 313 (TRI)

Applicable

California proposition 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Section 16. Other information

References and sources for data

Globally Harmonized System of classification and labelling of chemicals, UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 22nd edit., 2021 UN

IMDG Code, 2020 Edition (Incorporating Amendment 40-20)

IATA Dangerous Goods Regulations (64th Edition) 2023

2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2023 TLVs and BEIs. (ACGIH)

JIS Z 7252 : 2019

JIS Z 7253 : 2019

2022 Recommendation on TLVs (JSOH)

Notification No. 0111-1 (January 11, 2022), Chemical Hazards Control Division, Industrial Safety and Health Department, Labour Standards Bureau, Ministry of Health, Labour and Welfare

Supplier's data/information

GESTIS-Stoffdatenbank

Pub Chem (OPEN CHEMISTRY DATABASE)

General Disclaimer

This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.

The GHS classification data given here is based on current Japan official data (NITE published in 2021).