

## Safety Data Sheet

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

#### 1.1 Product identifier:

Product name: Ammonia Gas

Product code (SDS NO): Ammonia\_Gas\_ML\_E1-1

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

Relevant identified uses of the product: Production of semiconductor

#### 1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier: Asahi Graphic Corp.

Address: 4-23-8 Ebisu, Shibuya-ku, Tokyo, 150-0013 Japan

Telephone number: +81-3-5424-3016

FAX: +81-3-5424-3018

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

### 2. Hazards identification

GHS classification and label elements of the product

#### 2.1 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 3

Skin corrosion/irritation: Category 1B

##### ENVIRONMENT HAZARDS

Hazardous to the aquatic environment (Acute): Category 1

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

#### 2.2 Label elements



Signal word: Danger

#### HAZARD STATEMENT

H220 Extremely flammable gas

H280 Contains gas under pressure; may explode if heated

H331 Toxic if inhaled

H314 Causes severe skin burns and eye damage

H400 Very toxic to aquatic life

#### PRECAUTIONARY STATEMENT

##### Prevention

P273 Avoid release to the environment.

P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

P260 Do not breathe dust/fume/gas/mist/vapors/spray.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray.

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.

## Response

- P381 Eliminate all ignition sources if safe to do so.  
 P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
 P391 Collect spillage.  
 P321 Specific treatment is required.  
 P310 Immediately call a POISON CENTER or doctor/physician.  
 P311 Call a POISON CENTER or 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/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. P233 Keep container tightly closed.  
 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.

## 3. Composition/information on ingredients

## Mixture/Substance selection:

## 3.1 Substance

| Ingredient name<br>HAZCODE_EU  | CAS No.<br>ECNO | Content (%) |
|--|-----------------|-------------|
| Ammonia  | 7664-41-7       | >99         |
| Flam. Gas 2, H221; Press. Gas; Acute Tox. 3, H331;<br>Skin Corr. 1B, H314; Aquatic Acute 1, H400 | 231-635-3       |             |

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

## 4. First-aid measures

## 4.1 Descriptions of first-aid measures

## General measures

- Immediately call a POISON CENTER or doctor/physician.  
 Call a POISON CENTER or doctor/physician.

## IF INHALED

- Remove person to fresh air and keep comfortable for breathing.  
 Call a POISON CENTER or doctor/physician if you feel unwell.

## IF ON SKIN (or hair)

- Take off immediately all contaminated clothing. Rinse skin with water/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 or doctor/physician if you feel unwell.

#### 4.3 Indication of any immediate medical attention and special treatment needed

Specific treatment is required.

### 5. Fire-fighting measures

#### 5.1 Extinguishing media

Suitable extinguishing media

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

#### 5.2 Specific hazards arising from the substance or mixture

Will form toxic nitrogen oxides upon combustion.

Containers may explode when heated.

#### 5.3 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.

Eliminate all ignition sources if safe to do so.

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/flame resistant/retardant clothing.

Wear protective gloves/protective clothing/eye protection/face protection.

Firefighters should wear self-contained breathing apparatus with full face piece operated positive pressure mode.

### 6. Accidental release measures

#### 6.1 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.

#### 6.2 Environmental precautions

Prevent spills from entering sewers, watercourses or low areas.

If flown out into rivers, contact competent authorities.

#### 6.3 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

Collect spillage.

Stop leak if safe to do so.

### 7. Handling and storage

#### 7.1 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/sparks/open flames/hot surfaces. – No smoking.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

(Exhaust/ventilator)

Exhaust/ventilator should be available.

#### Safety Measures

Use only outdoors or in a well-ventilated area.

Wear protective gloves, protective clothing or face protection.

#### Any incompatibilities

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

#### Advice on general occupational hygiene

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.

### 7.2 Storage

#### Conditions for safe storage

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

## 8. Exposure controls/personal protection

### 8.1 Control parameters

#### Adopted value

(Ammonia)

ACGIH(1970) TWA: 25ppm;

STEL: 35ppm (Eye dam; URT irr)

Malaysia OEL (Occupational Safety Health Act 1994 [Act 514] Part III)

(Ammonia)

TWA: 25ppm, 17mg/m<sup>3</sup>

### 8.2 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.

## 9. Physical and Chemical Properties

### 9.1 Information on basic physical and chemical properties

Physical state: Gas(Liquefied gas)

Color: Colorless

Odor: Irritant odor

Boiling point or initial boiling point:  $-33.3^{\circ}\text{C}$

Melting point/Freezing point:  $-77.7^{\circ}\text{C}$

Flammability (gases, liquids and solids): Flam. Gas 1, H220

Auto-ignition temperature:  $630^{\circ}\text{C}$

Critical temperature:  $132.45^{\circ}\text{C}$

Lower and upper explosion limit/flammability limit:

Lower explosion limit: 15.4vol %

Upper explosion limit: 33.6vol %

Vapor pressure: 1013kPa( $26^{\circ}\text{C}$ )

Relative vapor density (Air=1): 0.6

Density and/or relative density: 0.7( $-33^{\circ}\text{C}$ )

Solubility:

Solubility in water: 540g/liter( $20^{\circ}\text{C}$ )

## 10. Stability and Reactivity

### 10.2 Chemical stability

Stable under normal storage/handling conditions.

### 10.3 Possibility of hazardous reactions

May form explosive gaseous mixture with air.

### 10.5 Incompatible materials

Acids, Oxidizing agents, Alcohols, Metals

### 10.6 Hazardous decomposition products

Nitrogen oxides

## 11. Toxicological Information

### 11.1 Information on toxicological effects

Acute toxicity data is not available.

Irritant properties

Skin corrosion/irritation data is not available.

Serious eye damage/irritation data is not available.

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

Carcinogenic effects data is not available.

Teratogenic effects data is not available.

Reproductive toxicity data is not available.

STOT

STOT-single exposure data is not available.

STOT-repeated exposure data is not available.

Aspiration hazard data is not available.

## 12. Ecological Information

### 12.1 Ecotoxicity

Aquatic toxicity

Very toxic to aquatic life

**Water solubility**

(Ammonia)

54 g/100 ml (20°C) (ICSC, 2013)

**12.2 Persistence and degradability**

Persistence and degradability data is not available.

**12.3 Bioaccumulative potential**

Bioaccumulative potential data is not available.

**12.4 Mobility in soil**

Mobility in soil data is not available.

**12.6 Other adverse effects**

Ozone depleting chemical data is not available.

**13. Disposal considerations****13.1 Waste treatment methods**

Avoid release to the environment (– if this is not the intended use).

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

**14. Transport Information****UN No., UN CLASS**

14.1 UN No.: 1005

14.2 Proper Shipping Name :

AMMONIA, ANHYDROUS

14.3 Class or division : 2.3

Subsidiary hazard(s) : 8

ERG GUIDE No.: 125

Special provisions No.: 23; 379

**IMDG Code (International Maritime Dangerous Goods Regulations)**

14.1 UN No.: 1005

14.2 Proper Shipping Name :

AMMONIA, ANHYDROUS

14.3 Class or division : 2.3

Subsidiary hazard(s) : 8

Special provisions No.: 23; 379

**IATA Dangerous Goods Regulations**

14.1 UN No.: 1005

14.2 Proper Shipping Name :

AMMONIA, ANHYDROUS

14.3 Class or division : 2.3

Subsidiary hazard(s) : 8

Special provisions No.: A2

**14.5 Environmental hazards****MARPOL Annex III – Prevention of pollution by harmful substances**

Marine pollutants (yes/no) : yes

**MARPOL Annex V – Prevention of pollution by garbage discharge**

Hazardous to the aquatic environment – acute hazard: cat.1

Ammonia

## 15. Regulatory Information

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

Other information is not available.

Other regulatory information

We are not able to check up the regulatory information with regard to the substances in your country or region, therefore, we request this matter would be filled by your responsibility.

## 16. Other information

GHS classification and labelling

Flam. Gas 1: H220 Extremely flammable gas

Press. Gas L: H280 Contains gas under pressure; may explode if heated

Acute Tox. 3: H331 Toxic if inhaled

Skin Corr. 1B: H314 Causes severe skin burns and eye damage

Aquatic Acute 1: H400 Very toxic to aquatic life

Reference Book

Globally Harmonized System of classification and labelling of chemicals, (6th ed., 2015), UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 20th edit., 2017 UN

IMDG Code, 2018 Edition (Incorporating Amendment 39-18)

IATA Dangerous Goods Regulations (60th Edition) 2019

Classification, labelling and packaging of substances and mixtures (table3-1 ECNO6182012)

2016 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2019 TLVs and BEIs. (ACGIH)

<http://monographs.iarc.fr/ENG/Classification/index.php>

Supplier's data/information

ICOP CHC 2014

Malaysia Occupational Safety Health Act 1994 [Act 514] Part III

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 EU official data (EU CLP published in 01.03.2018).

But the data are partially changed based on our judgement.