SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

| Trade name | Hydrogen bromide |
| SDS no | SDS-068-CLP |
| Chemical description | Hydrogen bromide |
| CAS No | 10035-10-6 |
| EC no | 233-113-0 |
| EC index no | 035-002-00-0 |
| Registration-No. | 01-2119479072-39 |
| Chemical formula | HBr |

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

Relevant identified uses:
- Industrial and professional. Perform risk assessment prior to use.
- Test gas/Calibration gas.
- Laboratory use.
- Use for manufacture of electronic/photovoltaic components.
- Contact supplier for more information on uses.

Uses advised against:
- Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification:
Air Liquide UK Ltd.
Station Road, Coleshill
B46 1JY Birmingham United Kingdom
01675462424
genqe.aluk@airliquide.com

1.4. Emergency telephone number

Emergency telephone number:
01675 462695

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards:
- Gases under pressure: Liquefied gas - H280

Health hazards:
- Acute toxicity (inhalation:gas) Category 3 - H331
- Skin corrosion/irritation, Category 1A - H314
- Serious eye damage/eye irritation, Category 1 - H318
- Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation - H335

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]
Not classified as dangerous substance / mixture.

2.2. Label elements
SECTION 3: Composition/information on ingredients

3.1. Substance

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Directive 67/548/EEC</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen bromide</td>
<td>(CAS No) 10035-10-6</td>
<td>100</td>
<td>Not classified</td>
<td>Press. Gas (Liq.), H280, Acute Tox. 3 (Inhalation:gas), H331</td>
</tr>
<tr>
<td></td>
<td>(EC no) 233-113-0</td>
<td></td>
<td></td>
<td>Skin Corr. 1A, H314, Eye Dam. 1, H318, STOT SE 3, H335</td>
</tr>
<tr>
<td></td>
<td>(EC index no) 035-002-00-0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Registration-No.) 01-2119479072-39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contains no other components or impurities which will influence the classification of the product.

Full text of R-phrases see section 16. Full text of H-statements see section 16.

3.2. Mixture

: Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation

: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- **Skin contact**: Remove contaminated clothing. Drench affected area with water for at least 15 minutes.

- **Eye contact**: Immediately flush eyes thoroughly with water for at least 15 minutes.

- **Ingestion**: Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects, both acute and delayed

May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Corrosive to the respiratory tract. Material is destructive to tissue of the mucous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. Refer to section 11.

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

Treat with corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- **Suitable extinguishing media**: Water spray or fog. Dry powder. Carbon dioxide. Foam.

- **Unsuitable extinguishing media**: Do not use water jet to extinguish.

#### 5.2. Special hazards arising from the substance or mixture

**Specific hazards**: Exposure to fire may cause containers to rupture/explode.

**Hazardous combustion products**: None that are more toxic than the product itself.

#### 5.3. Advice for fire-fighters

**Specific methods**: Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. If possible, stop flow of product. Use water spray or fog to knock down fire fumes if possible. Move containers away from the fire area if this can be done without risk.

**Special protective equipment for fire fighters**: Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- Try to stop release.
- Evacuate area.
- Monitor concentration of released product.
- Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
- Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
- Ensure adequate air ventilation.
- Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
- Act in accordance with local emergency plan.
- Stay upwind.
6.2. Environmental precautions

: Try to stop release.
  Reduce vapour with fog or fine water spray.

6.3. Methods and material for containment and cleaning up

: Hose down area with water.
  Ventilate area.
  Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4. Reference to other sections

: See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

: The substance must be handled in accordance with good industrial hygiene and safety procedures.
  Only experienced and properly instructed persons should handle gases under pressure.
  Consider pressure relief device(s) in gas installations.
  Ensure the complete gas system was (or is regularly) checked for leaks before use.
  Do not smoke while handling product.
  Avoid exposure, obtain special instructions before use.
  Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
  Installation of a cross purge assembly between the cylinder and the regulator is recommended.
  Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
  Avoid suck back of water, acid and alkalis.
  Do not breathe gas.

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions.
  Do not allow backfeed into the container.
  Protect cylinders from physical damage; do not drag, roll, slide or drop.
  When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
  Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
  If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
  Never attempt to repair or modify container valves or safety relief devices.
  Damaged valves should be reported immediately to the supplier.
  Keep container valve outlets clean and free from contaminants particularly oil and water.
  Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
  Close container valve after each use and when empty, even if still connected to equipment.
  Never attempt to transfer gases from one cylinder/container to another.
  Never use direct flame or electrical heating devices to raise the pressure of a container.
  Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Observe all regulations and local requirements regarding storage of containers.
  Containers should not be stored in conditions likely to encourage corrosion.
  Container valve guards or caps should be in place.
  Containers should be stored in the vertical position and properly secured to prevent them from falling over.
  Stored containers should be periodically checked for general condition and leakage.
  Keep container below 50°C in a well ventilated place.
  Store containers in location free from fire risk and away from sources of heat and ignition.
  Keep away from combustible materials.

7.2. Conditions for safe storage, including any incompatibilities

: Observe all regulations and local requirements regarding storage of containers.
  Containers should not be stored in conditions likely to encourage corrosion.
  Container valve guards or caps should be in place.
  Containers should be stored in the vertical position and properly secured to prevent them from falling over.
  Stored containers should be periodically checked for general condition and leakage.
  Keep container below 50°C in a well ventilated place.
  Store containers in location free from fire risk and away from sources of heat and ignition.
  Keep away from combustible materials.

7.3. Specific end use(s)
## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

**Hydrogen bromide (10035-10-6)**

<table>
<thead>
<tr>
<th>OEL: Occupational Exposure Limits</th>
<th>United Kingdom</th>
<th>WEL - STEL - UK [mg/m³]</th>
<th>3 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEL - STEL - UK [ppm]</td>
<td></td>
<td>10 ppm</td>
<td></td>
</tr>
</tbody>
</table>

**OEL**
- Acute - local effects, inhalation: 6.7 mg/m³
- Acute - systemic effects, inhalation: 6.7 mg/m³
- Long-term - local effects, inhalation: 6.7 ppm
- Long-term - systemic effects, inhalation: 6.7 ppm

**DNEL: Derived no effect level (Workers)**
- Acute - local effects, inhalation: 6.7 mg/m³
- Acute - systemic effects, inhalation: 6.7 mg/m³
- Long-term - local effects, inhalation: 6.7 ppm
- Long-term - systemic effects, inhalation: 6.7 ppm

**PNEC: Predicted no effect concentration**
- Aqua (freshwater): 0.019 mg/l

### 8.2. Exposure controls

#### 8.2.1. Appropriate engineering controls

- Provide adequate general and local exhaust ventilation.
- Product to be handled in a closed system.
- Preferably use only permanent leak-tight installations (e.g. welded pipes).
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Gas detectors should be used when toxic gases may be released.
- Consider work permit system e.g. for maintenance activities.

#### 8.2.2. Individual protection measures, e.g. personal protective equipment

- A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
  - Protect eyes, face and skin from liquid splashes.
  - Ensure adequate ventilation.
  - PPE compliant to the recommended EN/ISO standards should be selected.

  **Eye/face protection**
  - Wear safety glasses with side shields.
  - Wear goggles and a face shield when transfilling or breaking transfer connections.
  - Standard EN 166 - Personal eye-protection.
  - Provide readily accessible eye wash stations and safety showers.

  **Skin protection**
  - **Hand protection**
    - Wear working gloves when handling gas containers.
    - Standard EN 388 - Protective gloves against mechanical risk.
    - Wear chemically resistant protective gloves.
    - Standard EN 374 - Protective gloves against chemicals.
    - Neoprene rubber (HNBR)
    - Natural rubber (NR)
    - Consult glove manufacturer’s product information on material suitability and material thickness.
    - The breakthrough time of the selected gloves must be greater than the intended use period.
  - **Other**
    - Wear safety shoes while handling containers.
    - Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
    - Keep suitable chemically resistant protective clothing readily available for emergency use.
    - Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.
• Respiratory protection: Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known. Use gas filters and full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. Recommended: Filter E (yellow). Consult respiratory device supplier’s product information for the selection of the appropriate device. Gas filters do not protect against oxygen deficiency. Standard EN 14387 - Gas filter(s), combined filter(s) and full face mask - EN 136. Keep self contained breathing apparatus readily available for emergency use. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

• Thermal hazards: None necessary.

8.2.3. Environmental exposure controls: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance
- Physical state at 20°C / 101.3kPa: Gas.
- Colour: Colourless. Gives off white fumes in moist air.

Odour: Pungent.
Odour threshold: Odour threshold is subjective and inadequate to warn of overexposure.

pH value: If dissolved in water pH-value will be affected.

Molar mass: 81 g/mol
Melting point: -87 °C
Boiling point: -66.7 °C
Flash point: Not applicable for gases and gas mixtures.

Critical temperature [°C]: 90 °C
Evaporation rate (ether=1): Not applicable for gases and gas mixtures.

Flammability range: Non flammable.
Vapour pressure [20°C]: 21 bar(a)
Vapour pressure [50°C]: 42 bar(a)
Relative density, gas (air=1): 2.8
Relative density, liquid (water=1): 2.2
Solubility in water: 700000 mg/l
Partition coefficient n-octanol/water [log Kow]: 0.63
Auto-ignition temperature: Not applicable.
Viscosity [20°C]: Not applicable.

9.2. Other information

Other data: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No reactivity hazard other than the effects described in sub-sections below.

10.4. Conditions to avoid

Avoid moisture in installation systems.

10.5. Incompatible materials

Reacts with most metals in the presence of moisture, liberating hydrogen, an extremely flammable gas.

With water causes rapid corrosion of some metals.

Reacts with water to form corrosive acids.

May react violently with alkalis.

Moisture.

For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Delayed fatal pulmonary oedema possible.

LC50 inhalation rat (ppm) 1430 ppm/4h

Skin corrosion/irritation

Severe corrosion to skin at high concentrations.

Serious eye damage/irritation

Severe corrosion to the eyes at high concentrations.

Respiratory or skin sensitisation

No known effects from this product.

Germ cell mutagenicity

No known effects from this product.

Carcinogenicity

No known effects from this product.

Toxic for reproduction : Fertility

No known effects from this product.

Toxic for reproduction : unborn child

No known effects from this product.

STOT-single exposure

Severe corrosion to the respiratory tract at high concentrations.

Corrosive to the respiratory tract

STOT-repeated exposure

No known effects from this product.

Aspiration hazard

Not applicable for gases and gas mixtures.

SECTION 12: Ecological information

12.1. Toxicity

EC50 48h - Daphnia magna [mg/l] 19 mg/l

EC50 72h - Algae [mg/l] 130 mg/l

LC50 96 h - Fish [mg/l] 65 mg/l

12.2. Persistence and degradability

Assessment

Not applicable for inorganic gases.
12.3. **Bioaccumulative potential**

**Assessment**: Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. **Mobility in soil**

**Assessment**: Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. **Results of PBT and vPvB assessment**

**Assessment**: Not classified as PBT or vPvB.

12.6. **Other adverse effects**

**Effect on ozone layer**: None.

**Effect on the global warming**: No known effects from this product.

**Effect on water bodies**: May cause pH changes in aqueous ecological systems.

**Effect on terrestrial species**: Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

**Effect on the aquatic environment**: Not classified as PBT or vPvB.

**Effect on ground water**: Not expected to cause ground or water pollution.

**Effect on the atmosphere**: Not expected to cause ground or water pollution.

**Effect on the ozone layer**: None.

**Effect on the global warming**: No known effects from this product.

**Effect on soil and subsoil**: Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

**Effect on water bodies**: May cause pH changes in aqueous ecological systems.

**Effect on terrestrial species**: Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

**Effect on the aquatic environment**: Not classified as PBT or vPvB.

**Effect on ground water**: Not expected to cause ground or water pollution.

**Effect on the atmosphere**: Not expected to cause ground or water pollution.

**Effect on the ozone layer**: None.

13.1. **Waste treatment methods**

Contact supplier if guidance is required.

Must not be discharged to atmosphere.

Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere.

Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction.

Ensure that the emission levels from local regulations or operating permits are not exceeded.

Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org for more guidance on suitable disposal methods.

**List of hazardous waste codes (from Commission Decision 2001/118/EC)**: 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. **Additional information**

None.

**SECTION 14: Transport information**

14.1. **UN number**

UN-No.: 1048

14.2. **UN proper shipping name**

**Transport by road/rail (ADR/RID)**: HYDROGEN BROMIDE, ANHYDROUS

**Transport by air (ICAO-TI / IATA-DGR)**: HYDROGEN BROMIDE, ANHYDROUS

**Transport by sea (IMDG)**: HYDROGEN BROMIDE, ANHYDROUS

14.3. **Transport hazard class(es)**

**Labelling**: 2.3 : Toxic gases

8 : Corrosive substances
Hydrogen bromide

Class : 2
Classification code : 2TC
Hazard identification number : 268
Tunnel Restriction : C/D - Tank carriage: Passage forbidden through tunnels of category C, D and E. Other carriage: Passage forbidden through tunnels of category D and E

Transport by air (ICAO-TI / IATA-DGR)
Class / Div. (Sub. risk(s)) : 2.3 (8)

Transport by sea (IMDG)
Class / Div. (Sub. risk(s)) : 2.3 (8)
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group
Transport by road/rail (ADR/RID) : Not applicable
Transport by air (ICAO-TI / IATA-DGR) : Not applicable
Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards
Transport by road/rail (ADR/RID) : None.
Transport by air (ICAO-TI / IATA-DGR) : None.
Transport by sea (IMDG) : None.

14.6. Special precautions for user
Packing Instruction(s)
Transport by road/rail (ADR/RID) : P200
Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : Forbidden
Cargo Aircraft only : Forbidden
Transport by sea (IMDG) : P200

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
: Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
EU-Regulations

Air Liquide UK Ltd.
Station Road, Coleshill B46 1JY
Birmingham United Kingdom
01675462424
Hydrogen bromide

Restrictions on use : None.
Seveso directive 96/82/EC : Listed.

National regulations
National legislation : Ensure all national/local regulations are observed.
Water hazard class (WGK) : -
Kenn-Nr. : 217

15.2. Chemical safety assessment
: A CSA has been carried out.

SECTION 16: Other information

Training advice : Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard.
Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of R-, H- and EUH-phrases

| Acute Tox. 3 (Inhalation:gas) | Acute toxicity (inhalation:gas) Category 3 |
| Acute toxicity (inhalation:gas) Category 3 |
| Eye Dam. 1 | Serious eye damage/eye irritation, Category 1 |
| Press. Gas (Liq.) | Gases under pressure : Liquefied gas |
| Skin Corr. 1A | Skin corrosion/irritation, Category 1A |
| STOT SE 3 | Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation |
| H280 | Contains gas under pressure; may explode if heated |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious eye damage |
| H331 | Toxic if inhaled |
| H335 | May cause respiratory irritation |

DISCLAIMER OF LIABILITY
: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.