Isobutylene (0.0005% - 0.9%) in balance Nitrogen

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

1.1. Product identifier
   Product form : Mixture
   Product name : Isobutylene (0.0005% - 0.9%) in balance Nitrogen
   Replaces ISC MSDS No. : 1810-4588

1.2. Relevant identified uses of the substance or mixture and uses advised against
   Use of the substance/mixture : Test gas/Calibration gas.

1.3. Details of the supplier of the safety data sheet
   U.S. Supplier: Industrial Scientific Corporation
   1 Life Way
   Pittsburgh, PA 15205-7500
   Phone (412) 788-4353
   TOLL-FREE 800-DETECTS
   Fax (412) 788-8353

   MANUFACTURER: CALGAZ
   821 Chesapeake Drive
   Cambridge, MD 21613

1.4. Emergency telephone number
   Emergency number : CHEMTREC: 1-800-424-9300
                      Internationally: 1-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
   Classification (GHS-US)
   Compressed gas H280
   Full text of H-phrases: see section 16

2.2. Label elements
   GHS-US labeling
   Hazard pictograms (GHS-US) :
   
   Signal word (GHS-US) : Warning
   Hazard statements (GHS-US) : H280 - Contains gas under pressure; may explode if heated
   Precautionary statements (GHS-US) :
   P202 - Do not handle until all safety precautions have been read and understood
   P271 - Use only outdoors or in a well-ventilated area
   P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
   P313 - Get medical advice/attention
   P403 - Store in a well-ventilated place
   CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
   CGA-PG05 - Use a back flow preventive device in the piping
   CGA-PG06 - Close valve after each use and when empty
   CGA-PG10 - Use only with equipment rated for cylinder pressure
   CGA-PG14 - Approach suspected leak area with caution
   CGA-PG21 - Open valve slowly

2.3. Other hazards
   No additional information available

2.4. Unknown acute toxicity (GHS US)
   Not applicable
Isobutylene (0.0005% - 0.9%) in balance Nitrogen
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 3: Composition/information on ingredients

3.1. Substance
Not applicable

3.2. Mixture

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>(CAS No) 7727-37-9</td>
<td>99.1 - 99.9995</td>
<td>Compressed gas, H280</td>
</tr>
<tr>
<td>Isobutylene</td>
<td>(CAS No) 115-11-7</td>
<td>0.0005 - 0.9</td>
<td>Flam. Gas 1, H220</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures
First-aid measures after inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
First-aid measures after skin contact: Adverse effects not expected from this product.
First-aid measures after eye contact: Adverse effects not expected from this product.
First-aid measures after ingestion: Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed
Symptoms/injuries after inhalation: May displace oxygen and cause rapid suffocation.
Symptoms/injuries after skin contact: Adverse effects not expected from this product.
Symptoms/injuries after eye contact: Adverse effects not expected from this product.
Symptoms/injuries after ingestion: Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration: Not known.
Chronic symptoms: Adverse effects not expected from this product.

4.3. Indication of any immediate medical attention and special treatment needed
If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media: Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media: Do not use water jet.

5.2. Special hazards arising from the substance or mixture
Fire hazard: The product is not flammable.
Explosion hazard: Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
Reactivity: None known.

5.3. Advice for firefighters
Firefighting instructions: In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
Protection during firefighting: Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.
Specific methods: Exposure to fire may cause containers to rupture/explode. Continue water spray from protected position until container stays cool. Move containers away from the fire area if this can be done without risk.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
General measures: Ensure adequate ventilation.

6.1.1. For non-emergency personnel
Protective equipment: Wear protective equipment consistent with the site emergency plan.
6.1.2. For emergency responders
Protective equipment: Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
Emergency procedures: Evacuate and limit access. Ventilate area.

6.2. Environmental precautions
Try to stop release if safe to do so.

6.3. Methods and material for containment and cleaning up
For containment: Try to stop release if safe to do so.
Methods for cleaning up: Dispose of this material and its container in accordance with local regulations.

6.4. Reference to other sections
See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Additional hazards when processed: Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure.
Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.
Safe handling of the gas receptacle: Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
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 remove or deface labels provided by the supplier for the identification of the cylinder contents. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Hygiene measures: Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures: Comply with applicable regulations.
Storage conditions: Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area.
Incompatible products: None known.
Incompatible materials: None known.
Storage area: Store away from heat. Store in a well-ventilated place.

7.3. Specific end use(s)
See Section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Isobutylene (0.0005% - 0.9%) in balance Nitrogen
ACGIH: Not applicable
OSHA: Not applicable
Isobutylene (115-11-7)
ACGIH: ACGIH TWA (ppm) 250 ppm
OSHA: Not applicable
Nitrogen (7727-37-9)
ACGIH: Not applicable
OSHA: Not applicable

8.2. Exposure controls
Appropriate engineering controls: Provide adequate general and local exhaust ventilation. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities. Ensure exposure is below occupational exposure limits.
Isobutylene (0.0005% - 0.9%) in balance Nitrogen
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Skin and body protection : Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.
Respiratory protection : None necessary during normal and routine operations. See Sections 5 & 6.
Thermal hazard protection : None necessary during normal and routine operations.
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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear, colorless gas.</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Coal gas Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable for gas-mixtures.</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (ether=1)</td>
<td>Not applicable for gas-mixtures.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>See Sect. 2.1 &amp; 2.2</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>Not applicable - not flammable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable - not flammable.</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Supports combustion. Not combustible but enhances combustion of other substances. None.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>Not applicable for gas-mixtures.</td>
</tr>
<tr>
<td>Relative gas density</td>
<td>Lighter or similar to air.</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: Solubility in water of component(s) of the mixture :</td>
</tr>
<tr>
<td>Log Pow</td>
<td>Not applicable for gas-mixtures.</td>
</tr>
<tr>
<td>Log Kow</td>
<td>Not applicable for gas-mixtures.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

9.2. Other information

Additional information : None.

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).
### 10.5. Incompatible materials

None known.

### 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**: Not classified

**Isobutylene (115-11-7)**
- **LC50 inhalation rat (mg/l)**: 620 mg/l/4h
- **LC50 inhalation rat (ppm)**: 239620.46 ppm/4h
- **ATE US (gases)**: 271823.000 ppmV/4h
- **ATE US (vapors)**: 620.000 mg/l/4h
- **ATE US (dust, mist)**: 620.000 mg/l/4h

**Nitrogen (7727-37-9)**
- **LC50 inhalation rat (ppm)**: 820000 ppm/4h

**Skin corrosion/irritation**: Not classified

**Serious eye damage/irritation**: Not classified

**Respiratory or skin sensitization**: Not classified

**Germ cell mutagenicity**: Not classified

**Carcinogenicity**: Not classified

**Isobutylene (115-11-7)**
- **National Toxicology Program (NTP) Status**: 1 - Evidence of Carcinogenicity

**Reproductive toxicity**: Not classified

**Specific target organ toxicity (single exposure)**: Not classified

**Specific target organ toxicity (repeated exposure)**: Not classified

**Aspiration hazard**: Not classified

**Symptoms/injuries after inhalation**: May displace oxygen and cause rapid suffocation.

**Symptoms/injuries after skin contact**: Adverse effects not expected from this product.

**Symptoms/injuries after eye contact**: Adverse effects not expected from this product.

**Symptoms/injuries after ingestion**: Ingestion is not considered a potential route of exposure.

**Symptoms/injuries upon intravenous administration**: Not known.

**Chronic symptoms**: Adverse effects not expected from this product.

### SECTION 12: Ecological information

#### 12.1. Toxicity

**Ecology - general**: Classification criteria are not met.

#### 12.2. Persistence and degradability

**Isobutylene (0.0005% - 0.9%) in balance Nitrogen**
- **Persistence and degradability**: No data available.

**Isobutylene (115-11-7)**
- **Persistence and degradability**: The substance is biodegradable. Unlikely to persist.

**Nitrogen (7727-37-9)**
- **Persistence and degradability**: No ecological damage caused by this product.
12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Isobutylene (0.0005% - 0.9%) in balance Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
</tr>
<tr>
<td>Log Kow</td>
</tr>
<tr>
<td>Bioaccumulative potential</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Isobutylene (115-11-7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
</tr>
<tr>
<td>Bioaccumulative potential</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nitrogen (7727-37-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
</tr>
<tr>
<td>Bioaccumulative potential</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

<table>
<thead>
<tr>
<th>Isobutylene (0.0005% - 0.9%) in balance Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility in soil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Isobutylene (115-11-7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology - soil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nitrogen (7727-37-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology - soil</td>
</tr>
</tbody>
</table>

12.5. Other adverse effects

Effect on ozone layer: None.
Effect on the global warming: No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

<table>
<thead>
<tr>
<th>Waste treatment methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waste disposal recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to the CGA Pamphlet P-63 &quot;Disposal of Gases&quot; available at <a href="http://www.cganet.com">www.cganet.com</a> for more guidance on suitable disposal methods.</td>
</tr>
</tbody>
</table>

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

<table>
<thead>
<tr>
<th>Transport document description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1956 Compressed gas, n.o.s.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UN-No.(DOT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1956</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proper Shipping Name (DOT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed gas, n.o.s.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard labels (DOT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 - Non-flammable gas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Packaging Non Bulk (49 CFR 173.xxx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>302;305</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Packaging Bulk (49 CFR 173.xxx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>314;315</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>G - Identifies PSN requiring a technical name</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Packaging Exceptions (49 CFR 173.xxx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>306;307</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Vessel Stowage Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel.</td>
</tr>
</tbody>
</table>

04/27/2015 05:25 PM  EN (English US)  SDS ID: 50253 / P/N 3601
Isobutylene (0.0005% - 0.9%) in balance Nitrogen
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Additional information

Other information : No supplementary information available.

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.

ADR
Transport document description : UN 1956 COMPRESSED GAS, N.O.S., 2.2
Class (ADR) : 2 - Gases
Hazard labels (ADR) : 2.2 - Non-flammable compressed gas

Transport by sea
UN-No. (IMDG) : 1956
Proper Shipping Name (IMDG) : COMPRESSED GAS, N.O.S.
Class (IMDG) : 2.2 - Non-flammable, non-toxic gases

Air transport
UN-No.(IATA) : 1956
Proper Shipping Name (IATA) : COMPRESSED GAS, N.O.S.
Class (IATA) : 2

SECTION 15: Regulatory information

15.1. US Federal regulations

Isobutylene (115-11-7)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Nitrogen (7727-37-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA
Isobutylene (115-11-7)
Listed on the Canadian DSL (Domestic Sustances List)

Nitrogen (7727-37-9)
Listed on the Canadian DSL (Domestic Sustances List)

WHMIS Classification : Class A - Compressed Gas

EU-Regulations

Isobutylene (115-11-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Nitrogen (7727-37-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]
No additional information available

National regulations
### Isobutylene (115-11-7)

- Listed on the AICS (Australian Inventory of Chemical Substances)
- Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
- Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
- Listed on the Korean ECL (Existing Chemicals List)
- Listed on NZIoC (New Zealand Inventory of Chemicals)
- Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

### Nitrogen (7727-37-9)

- Listed on the AICS (Australian Inventory of Chemical Substances)
- Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
- Listed on the Korean ECL (Existing Chemicals List)
- Listed on NZIoC (New Zealand Inventory of Chemicals)
- Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

### 15.3. US State regulations

| Isobutylene (115-11-7) | U.S. - Massachusetts - Right To Know List
| | U.S. - New Jersey - Right to Know Hazardous Substance List
| | U.S. - Pennsylvania - RTK (Right to Know) List

| Nitrogen (7727-37-9) | U.S. - Massachusetts - Right To Know List
| | U.S. - New Jersey - Right to Know Hazardous Substance List
| | U.S. - Pennsylvania - RTK (Right to Know) List

### SECTION 16: Other information

**Indication of changes**: Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.

**Other information**: This Safety Data Sheet is offered pursuant to OSHA’s Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

**Full text of H-phrases:**

- **Compressed gas**: Gases under pressure
- **Flam. Gas 1**: Flammable gases Category 1
- **Liquefied gas**: Gases under pressure
- **H220**: Extremely flammable gas
- **H280**: Contains gas under pressure; may explode if heated

**SDS US (GHS HazCom 2012)**

This Safety Data Sheet is offered pursuant to OSHA’s Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of Calgaz’s knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.