MATERIAL SAFETY DATA SHEET (MSDS)

SECTION 1. Product and company identification

1.1 Product identifier

Product Name : NITROGEN , LIQUID NITROGEN

Trade Names : nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG

Chemical formula : N_2

Cas No. : 7727-37-9

EC No. : -

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.

Uses advised against : Consumer use.

1.3 Details of the supplier of the safety data sheet

Company identification : United Industrial Gases Co., Ltd.
29 / 3 Moo.5 Bangna-Trad Road, T.Bangsaotong, A.Bangsaotong Samutprakarn 10570

Tel : 0-2338-1460

Emergency telephone number : (+66) 8516 71888

Fax : 0-2708-3873

E-mail : uiggases@gmail.com

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

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

Physical hazards : GASES UNDER PRESSURE - Compressed gas H280

2.2 Label elements

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

Hazard pictograms

GHS04

Signal word : Warning

Hazard statements : H280 Contains gas under pressure; may explode if heated
OSHA-H01 May displace oxygen and cause rapid suffocation

Precautionary statements (CLP) : P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Prevention : P202 Do not handle until all safety precautions have been read and understood
P280 Wear protective gloves/protective clothing/eye protection/face protection

: P271 Use only outdoors or in a well-ventilated area

Storage : P403 Store in a well ventilated place.

P308+P313 IF exposed or concerned: Get medical advice/attention

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing

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

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

SECTION 3. Composition / information on ingredients

Chemical Name	CAS No.	Chemical name/Synonyms	%	Classification (GHS-CA)
Nitrogen	7727-37-9	Nitrogen (liquified) / Nitrogen gas / Nitrogen, liquefied / NITROGEN / Nitrogen, compressed	100%	Press. Gas (Comp.), H280

SECTION 4. First aid measures

4.1 Description of first aid measures

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Ingestion : As this product is a gas, refer to the inhalation section.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation : At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

SECTION 5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

5.3 Special protective equipment and precautions for fire-fighters

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For nonemergency nonemergency personnel".

6.2 Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has

caused environmental pollution (sewers, waterways, soil or air).

6.3 Methods and material for containment and cleaning up

Small spills : Immediately contact emergency personnel. Stop leak if without risk.

Large spills : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous.

Advice on genera occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use (s) : -

SECTION 8. Exposure controls / personal protection

8.1 Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Nitrogen	ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant].

8.2 Exposure controls

8.2.1 Appropriate engineering controls

: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye / face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side shields.

Hand/Skine protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Respiratory protection : The gas can cause asphyxiation without warning by replacing the oxygen in the air. Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

8.2.3 Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	:	Gas.
Colour	:	Colorless.
Odour	:	Odorless.
Odour threshold	:	Not available.
pH value	:	Not available.
Molecular weight	:	28.02 g/mole
Melting point	:	-210.01°C (-346°F)
Freezing poin	:	Not available.

Boiling point	:	-196°C (-320.8°F)
Flash point	:	Product does not sustain combustion.]
Critical temperature [°C]	:	-146.95°C (-232.5°F)
Decomposition temperature	:	Not available.
Evaporation rate (ether = 1)	:	Not available.
Flammability range	:	Not available.
Vapour pressure [20 °C]	:	Not available.
Vapour pressure [50 °C]	:	Not available.
Relative density, gas (air = 1)	:	0.072
Relative density, liquid (water = 1)	:	Not available.
Vapor density	:	0.967 (Air = 1) Liquid Density@BP: 50.46 lb/ft3 (808.3 kg/m3)
Solubility in water	:	Not available.
Partition coefficient n-octanol / water [log Kow]	:	0.67
Auto-ignition temperature	:	Not available.
Viscosity [20 °C]	:	Not available.
Explosive Properties	:	Not available.
Oxidising Properties	:	Not available.
Coefficient of oxygen equivalency (Ci)	:	Not available.

SECTION 10. Stability and reactivity

10.1 Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	:	The product is stable.
10.3 Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	:	Do not allow gas to accumulate in low or confined areas.
10.5 Incompatible material	:	Not available.
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 available.
Irritation/Corrosion	:	Not available.
Sensitization	:	Not available.
Mutagenicity	:	Not available.
Carcinogenicity	:	Not available.
Reproductive toxicity	:	Not available.
Teratogenicity	:	Not available.
Specific target organ toxicity (single exposure)	:	Not available.
Specific target organ toxicity (repeated exposure	:	Not available.
Aspiration hazard	:	Not available.

Potential acute health effects

Eye contact	:	Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation	:	At very high concentrations, can displace the normal air and cause suffocation from lack

of oxygen.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Not available.

Inhalation : Not available.

Skin contact : Not available.

Ingestion : Not available.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General : Not available.

Carcinogenicity : Not available.

Mutagenicity : Not available.

Teratogenicity : Not available.

Developmental effects : Not available.

Fertility effects : Not available.

SECTION 12. Ecological information

12.1 Toxicity : Not available.

12.2 Persistence and degradability : Not available.

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Nitrogen	0.67	-	low

12.4 Mobility in soil Assessment : Not available.

12.5 Other adverse effects : Not available.

SECTION 13. Disposal considerations

13.1 Disposal Methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

SECTION 14. Transport information

14.1 In accordance withTDG

UN number	:	UN 1066
Proper shipping name	:	NITROGEN,COMPRESSED
Transport hazard class(es)	:	2.2
Packing group	:	-

14.2 Transport by sea

IMDG

UN number	:	UN 1066
Proper shipping name	:	NITROGEN,COMPRESSED
Transport hazard class(es)	:	2.2
Packing group	:	-

IATA

UN number	:	UN 1066
Proper shipping name	:	NITROGEN,COMPRESSED
Transport hazard class(es)	:	2.2
Packing group	:	-

SECTION 15. Regulatory information

U.S. Federal regulations	:	TSCA 8(a) CDR Exempt/Partial exemption: This material is listed or exempted.
Clean Air Act Section 112	:	Not available.
(b) Hazardous Air		
Pollutants (HAPs)		
Clean Air Act Section 602	:	Not available.
Class I Substances		
Clean Air Act Section 602	:	Not available.
Class II Substances		
DEA List I Chemicals	:	Not available.
(Precursor Chemicals)		
DEA List II Chemicals	:	Not available.
(Essential Chemicals)		

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ	:	Not available.

SARA 311/312

Classification	:	Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts

New York

New Jersey

Pennsylvania

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

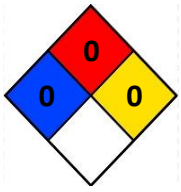
Not listed.

Inventory list

Australia	:	This material is listed or exempted.
Canada	:	This material is listed or exempted.
China	:	This material is listed or exempted.
Europe	:	This material is listed or exempted.
Japan	:	This material is listed or exempted. Japan inventory (ISHL): Not determined.
New Zealand	:	This material is listed or exempted.
Philippines	:	This material is listed or exempted.
Republic of Korea	:	This material is listed or exempted.
Taiwan	:	This material is listed or exempted.
Thailand	:	Not determined.
Turkey	:	Not determined.
United States	:	This material is active or exempted.
Viet Nam	:	This material is listed or exempted.

SECTION 16. Other information

Other information



NFPA health hazard	:	0	Substance not considered toxic under OSHA's Hazard Communication Standard. Under emergency conditions, this substance would offer no hazard beyond that of ordinary combustible material
NFPA fire hazard	:	0	Substance is not considered combustible or flammable under OSHA's Hazard Communication Standard. Substance that will not burn.

NFPA reactivity	: 0	Normally stable material that does not react with water. Substance not considered explosive under OSHA's Hazard Communication Standard.
NFPA specific hazard	: -	

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.