

Flammable Gas Mixture: 2 Nitropropane / Carbon Dioxide / Carbon Monoxide /  
Cyclohexane / Helium / Nitrogen / Propane

## Section 1. Chemical product and company identification

<b>Product Name</b>	: Flammable Gas Mixture: 2 Nitropropane / Carbon Dioxide / Carbon Monoxide / Cyclohexane / Helium / Nitrogen / Propane
<b>Supplier</b>	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
<b>Product use</b>	: Synthetic/Analytical chemistry.
<b>MSDS#</b>	: 007342
<b>Date of Preparation/Revision</b>	: <b>6/27/2007.</b>
<b>In case of emergency</b>	: 1-866-734-3438

## Section 2. Hazards identification

<b>Physical state</b>	: Gas.
<b>Emergency overview</b>	: Warning! FLAMMABLE GAS. CONTENTS UNDER PRESSURE. HARMFUL IF INHALED. CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: BLOOD, LUNGS, NERVOUS SYSTEM, CARDIOVASCULAR SYSTEM, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. SUSPECT CANCER HAZARD CONTAINS MATERIAL WHICH MAY CAUSE CANCER VAPOR MAY CAUSE FLASH FIRE. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.  Avoid contact with skin and clothing. Avoid breathing gas. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.  Contact with rapidly expanding gases can cause frostbite.
<b>Routes of entry</b>	: Inhalation,Dermal,Eyes
<b>Potential acute health effects</b>	
<b>Eyes</b>	: Moderately irritating to the eyes.
<b>Skin</b>	: Moderately irritating to the skin.
<b>Inhalation</b>	: Toxic by inhalation. Moderately irritating to the respiratory system.
<b>Ingestion</b>	: Ingestion is not a normal route of exposure for gases
<b>Potential chronic health effects</b>	: <b>CARCINOGENIC EFFECTS</b> Classified + (Proven.) by NIOSH [2-nitropropane]. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC [2-nitropropane]. Classified 2 (Reasonably Anticipated To Be Human Carcinogens.) by NTP, 2 (Suspected for human.) by European Union [2-nitropropane]. <b>MUTAGENIC EFFECTS</b> Not available. <b>TERATOGENIC EFFECTS</b> Not available.
<b>Medical conditions aggravated by overexposure</b>	: Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
<b>See toxicological Information (section 11)</b>	

## Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Propane	74-98-6	9.5 - 99	<b>ACGIH TLV (United States, 1/2004). Notes:</b> <b>ACGIH 2004 Adoption</b> TWA: 1000 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 6/2001).</b> TWA: 1800 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 1000 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 6/1993).</b> TWA: 1800 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 1000 ppm 8 hour(s). Form: All forms
Nitrogen	7727-37-9	1 - 99	<b>ACGIH TLV (United States, 9/2004).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 6/2001).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 5000 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 6/1993).</b> TWA: 9000 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms <b>ACGIH TLV (United States, 1/2005). Notes:</b> <b>Substances for which there is a Biological Exposure Index or Indices</b> TWA: 29 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 25 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 12/2001).</b> CEIL: 229 mg/m <sup>3</sup> Form: All forms CEIL: 200 ppm Form: All forms TWA: 40 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 35 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 8/1997).</b> TWA: 55 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 50 ppm 8 hour(s). Form: All forms <b>ACGIH TLV (United States, 1/2005).</b> TWA: 100 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 12/2001).</b> TWA: 1050 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 300 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 8/1997).</b> TWA: 1050 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 300 ppm 8 hour(s). Form: All forms <b>ACGIH TLV (United States, 1/2005). Notes:</b> <b>Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit</b>
Helium	7440-59-7	1 - 89	
Carbon Dioxide	124-38-9	0.5 - 30	
Carbon Monoxide	630-08-0	0.0025 - 20	<b>ACGIH TLV (United States, 1/2005). Notes:</b> <b>Substances for which there is a Biological Exposure Index or Indices</b> TWA: 29 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 25 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 12/2001).</b> CEIL: 229 mg/m <sup>3</sup> Form: All forms CEIL: 200 ppm Form: All forms TWA: 40 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 35 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 8/1997).</b> TWA: 55 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 50 ppm 8 hour(s). Form: All forms <b>ACGIH TLV (United States, 1/2005).</b> TWA: 100 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 12/2001).</b> TWA: 1050 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 300 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 8/1997).</b> TWA: 1050 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 300 ppm 8 hour(s). Form: All forms <b>ACGIH TLV (United States, 1/2005). Notes:</b> <b>Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit</b>
Cyclohexane	110-82-7	0.01 - 5	<b>ACGIH TLV (United States, 1/2005).</b> TWA: 100 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 12/2001).</b> TWA: 1050 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 300 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 8/1997).</b> TWA: 1050 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 300 ppm 8 hour(s). Form: All forms <b>ACGIH TLV (United States, 1/2005). Notes:</b> <b>Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit</b>
2-Nitropropane	79-46-9	0.001 - 0.9	<b>ACGIH TLV (United States, 1/2005). Notes:</b> <b>Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit</b>

(REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix A -- Carcinogens.

TWA: 36 mg/m<sup>3</sup> 8 hour(s). Form: All forms

TWA: 10 ppm 8 hour(s). Form: All forms

**OSHA PEL (United States, 8/1997).**

TWA: 90 mg/m<sup>3</sup> 8 hour(s). Form: All forms

TWA: 25 ppm 8 hour(s). Form: All forms

## Section 4. First aid measures

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

- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
- Ingestion** : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

## Section 5. Fire fighting measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : The lowest known value is 449.85°C (841.7°F) (Propane).
- Flammable limits** : The greatest known range is Lower: 12.5% Upper: 74.2% (Carbon monoxide)
- Products of combustion** : These products are carbon oxides (CO, CO<sub>2</sub>), nitrogen oxides (NO, NO<sub>2</sub>...).
- Fire hazards in presence of various substances** : Extremely flammable in presence of open flames, sparks and static discharge, of oxidizing materials.
- Fire fighting media and instructions** : In case of fire, use water spray (fog), foam, dry chemicals, or CO<sub>2</sub>.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

Extremely flammable. Gas may accumulate in confined areas, travel considerable distance to source of ignition and flash back causing fire or explosion.

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

## Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 7. Handling and storage

- Handling** : Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire, minimize ignition sources. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not puncture or incinerate container. Wash thoroughly after handling. High pressure gas. 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.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area. 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).

## Section 8. Exposure Controls, Personal Protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. The engineering controls also need to keep gas, vapor or dust concentrations below any explosive limits. Use explosion-proof ventilation equipment.

### Personal protection

- Eyes** : 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 or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. 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.  
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Full chemical resistant suit and self-contained breathing apparatus only by trained and authorized persons.

**Consult local authorities for acceptable exposure limits.**

## Section 9. Physical and chemical properties

- Molecular weight** : Not applicable.
- Molecular formula** : Not applicable.
- Boiling/condensation point** : Not available.
- Melting/freezing point** : -185.89°C (-302.6°F) based on data for: Propane. Weighted average: -219.54°C (-363.2°F)
- Critical temperature** : The lowest known value is -146.9°C (-232.4°F) (Nitrogen).
- Vapor density** : The highest known value is 1.6 (Air = 1) (Propane). Weighted average: 0.98 (Air = 1)
- Specific Volume (ft³/lb)** : Not applicable.
- Gas Density (lb/ft³)** : Weighted average: 0.03

## Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Highly reactive with oxidizing agents.  
Slightly reactive to reactive with combustible materials, metals, acids, alkalis.

## Section 11. Toxicological information

<u><b>Ingredient name</b></u>	<u><b>Test</b></u>	<u><b>Result</b></u>	<u><b>Route</b></u>	<u><b>Species</b></u>
Carbon Monoxide	LC50	3760 ppm (1 hour(s))	Inhalation	Rat
	LC50	2444 ppm (4 hour(s))	Inhalation	Mouse
Cyclohexane	LD50	12705 mg/kg	Oral	Rat
	LD50	813 mg/kg	Oral	Mouse
	LDLo	5500 mg/kg	Oral	Rabbit
2-Nitropropane	LD50	720 mg/kg	Oral	Rat
	LDLo	500 mg/kg	Oral	Rabbit
	LC50	980 ppm (1 hour (s))	Inhalation	Rat

- Chronic effects on humans** : **CARCINOGENIC EFFECTS** Classified + (Proven.) by NIOSH [2-nitropropane]. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC [2-nitropropane]. Classified 2 (Reasonably Anticipated To Be Human Carcinogens.) by NTP, 2 (Suspected for human.) by European Union [2-nitropropane]. Contains material which causes damage to the following organs: blood, lungs, the nervous system, cardiovascular system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

- Other toxic effects on humans** : Hazardous in case of skin contact (irritant).

### **Specific effects**

- Carcinogenic effects** : Contains material which may cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.

## Section 12. Ecological information

<u><b>Ingredient name</b></u>	<u><b>Species</b></u>	<u><b>Period</b></u>	<u><b>Result</b></u>
Cyclohexane	Pimephales promelas (LC50)	96 hour(s)	4.53 mg/l
	Pimephales promelas (LC50)	96 hour(s)	32.71 mg/l
	Lepomis macrochirus (LC50)	96 hour(s)	34.72 mg/l
	Pimephales promelas (LC50)	96 hour(s)	42.33 mg/l
	Poecilia reticulata (LC50)	96 hour(s)	57.68 mg/l
	Pimephales promelas (LC50)	96 hour(s)	93 mg/l
2-Nitropropane	Pimephales promelas (LC50)	96 hour(s)	<210 mg/l




- Products of degradation** : These products are carbon oxides (CO, CO<sub>2</sub>) and water, nitrogen oxides (NO, NO<sub>2</sub>...).
- Toxicity of the products of biodegradation** : The products of degradation are less toxic than the product itself.
- Environmental fate** : Not available.
- Environmental hazards** : No known significant effects or critical hazards.
- Toxicity to the environment** : Not available.

**Flammable Gas Mixture: 2 Nitropropane / Carbon Dioxide / Carbon Monoxide / Cyclohexane / Helium / Nitrogen / Propane**

## Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

## Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
<b>DOT Classification</b>	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-
<b>TDG Classification</b>	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		<b>Explosive Limit and Limited Quantity Index</b> 0.125  <b>ERAP Index</b> 3000  <b>Passenger Carrying Ship Index</b> Forbidden  <b>Passenger Carrying Road or Rail Index</b> Forbidden
<b>Mexico Classification</b>	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	Not applicable (gas).		-

## Section 15. Regulatory information

### United States

**U.S. Federal regulations** : TSCA 4(a) final test rules: 2-nitropropane  
 TSCA 8(a) PAIR: 2-nitropropane  
 TSCA 8(b) inventory: Helium; Propane; Carbon Dioxide; Nitrogen; Carbon monoxide; cyclohexane; 2-nitropropane  
 TSCA 12(b) one time export: 2-nitropropane  
 SARA 302/304/311/312 extremely hazardous substances: No products were found.  
 SARA 302/304 emergency planning and notification: No products were found.  
 SARA 302/304/311/312 hazardous chemicals: Helium; Propane; Carbon Dioxide; Nitrogen; Carbon monoxide; cyclohexane  
 SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Helium: Sudden Release of Pressure; Propane: Fire hazard, Sudden Release of Pressure; Carbon Dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard; Nitrogen: Sudden Release of Pressure; Carbon monoxide: Fire hazard, Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard; cyclohexane: Fire hazard, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard  
 Clean Water Act (CWA) 307: No products were found.  
 Clean Water Act (CWA) 311: cyclohexane



**Flammable Gas Mixture: 2 Nitropropane / Carbon Dioxide / Carbon Monoxide / Cyclohexane / Helium / Nitrogen / Propane**

Clean air act (CAA) 112 accidental release prevention: Propane  
Clean air act (CAA) 112 regulated flammable substances: Propane  
Clean air act (CAA) 112 regulated toxic substances: No products were found.

**SARA 313**

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	Cyclohexane	110-82-7	0.01 - 5
	2-Nitropropane	79-46-9	0.001 - 0.9
<b>Supplier notification</b>	Cyclohexane	110-82-7	0.01 - 5
	2-Nitropropane	79-46-9	0.001 - 0.9

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

**State regulations**

- : Pennsylvania RTK: Helium: (generic environmental hazard); Propane: (generic environmental hazard); Carbon Dioxide: (generic environmental hazard); Nitrogen: (generic environmental hazard); Carbon monoxide: (environmental hazard, generic environmental hazard); cyclohexane: (environmental hazard, generic environmental hazard); 2-nitropropane: (special hazard, environmental hazard, generic environmental hazard)  
Massachusetts RTK: Helium; Propane; Carbon Dioxide; Nitrogen; Carbon monoxide; cyclohexane; 2-nitropropane  
New Jersey: Helium; Propane; Carbon Dioxide; Nitrogen; Carbon monoxide; cyclohexane; 2-nitropropane

**California prop. 65**

- : **WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Carbon Monoxide	No.	Yes.	No.	No.
2-Nitropropane	Yes.	No.	No.	No.

**Canada****WHMIS (Canada)**

- : Class A: Compressed gas.  
Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).  
Class D-2A: Material causing other toxic effects (VERY TOXIC).  
CEPA DSL: Helium; Propane; Carbon Dioxide; Nitrogen; Carbon monoxide; cyclohexane; 2-nitropropane

**Section 16. Other information****United States****Label Requirements**

- : FLAMMABLE GAS.  
CONTENTS UNDER PRESSURE.  
HARMFUL IF INHALED.  
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:  
BLOOD, LUNGS, NERVOUS SYSTEM, CARDIOVASCULAR SYSTEM, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.  
SUSPECT CANCER HAZARD  
CONTAINS MATERIAL WHICH MAY CAUSE CANCER  
VAPOR MAY CAUSE FLASH FIRE.  
MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

**Canada****Label Requirements**

- : Class A: Compressed gas.  
Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).  
Class D-2A: Material causing other toxic effects (VERY TOXIC).

**Hazardous Material Information System (U.S.A.)**

<b>Health</b>	*	2
<b>Fire hazard</b>		4
<b>Reactivity</b>		0
<b>Personal protection</b>		C

**Flammable Gas Mixture: 2 Nitropropane / Carbon Dioxide / Carbon Monoxide / Cyclohexane / Helium / Nitrogen / Propane**

**National Fire Protection  
Association (U.S.A.) :**



**Notice to reader**

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.