



**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**PRODUCT IDENTIFIER:** **Krypton/Xenon**  
**GENERAL USE:** Specialty lighting, such as halogen headlights, lasers, and projector bulbs.  
**PRODUCT DESCRIPTION:** Krypton-xenon are rare atmospheric gases which are colorless, odorless, tasteless, nontoxic, monatomic and chemically inert.

**MANUFACTURER:**  
Dakota Gasification Company  
420 County Road 26  
Beulah, North Dakota 58523-9400  
(701) 873-6677

**EMERGENCY TELEPHONE NUMBERS:**  
Dakota Gasification (701) 873-6600  
CHEMTREC (800) 424-9300

**2. COMPOSITION / INFORMATION ON INGREDIENTS**

<u>INGREDIENTS</u>	<u>WT. %</u>	<u>CAS Registry #</u>
Krypton	80 - 95	7439-90-9
Oxygen	3.0 - 6.5	7782-44-7
Methane	0.00 - 0.10	74-82-8
Xenon	5.0 - 9.0	7440-63-3

**OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):**

**EXPOSURE LIMITS 8 hrs. TWA (ppm)**

	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Krypton	Not Established	Not Established
Oxygen	Not Established	Not Established
Methane	Not Established	Not Established
Xenon	Not Established	Not Established

**3. HAZARDS IDENTIFICATION / EMERGENCY OVERVIEW:**

Krypton and xenon are noncorrosive, nontoxic, and largely inert. They can act as simple asphyxiants by displacing air, thereby diluting the concentration of oxygen below levels necessary to support life. Inhalation in excessive concentrations can result in dizziness, nausea, vomiting, loss of consciousness, and death. Death may result from errors in judgment, confusion, or loss of consciousness which prevents self-rescue. At low oxygen concentrations, unconsciousness and death may occur in seconds without warning.

**POTENTIAL HEALTH EFFECTS:**

**EYE CONTACT:** Rare gases are inert and should not cause any eye effects.  
**SKIN CONTACT:** Rare gases are inert and should not cause any skin effects.  
**INHALATION:** These gases are inert and are classified as simple asphyxiants. Inhalation in excessive concentrations can result in dizziness, nausea, vomiting, loss of consciousness, and death. Death may result from errors in judgment, confusion, or loss of consciousness which prevent self-rescue. At low oxygen concentrations, unconsciousness and death may occur in seconds without warning.

#### 4. FIRST AID MEASURES

**INHALATION:** Remove the victim from the contaminated area while protecting yourself from exposure by wearing a supplied air type respirator. Put a similar respirator on the victim. Have someone contact medical assistance immediately. **If the victim has stopped breathing:** Open the victims airway, loosen the collar and belt, and administer artificial respiration. Administer oxygen through a bag-valve mask. Check the pulse. If the heart stops, administer CPR. If the heart beat is very slow, irregular or weak, be prepared to administer CPR. Continue your efforts until help arrives or the victim starts to breathe on his own. Do not leave the victim alone. Keep the victim warm and quiet. **If the victim is unconscious but breathing:** Lay him on his back. If he is vomiting, turn his head to the side. Clear and open his airway and loosen tight clothing. If available, give him oxygen to breathe. Keep him warm and quiet. Check his pulse periodically and be ready to administer CPR. Do not give an unconscious person anything to drink. **If the victim is conscious but coughing or short of breath:** Lay him down, cover him with a blanket and keep him quiet. Loosen tight clothing. Give him oxygen to breathe until help arrives. Check his pulse periodically. Do not leave him unattended. **If the victim is conscious and not coughing or short of breath:** Lay him down, cover him with a blanket and keep him quiet. Loosen tight clothing. Check his pulse periodically. Do not leave him unattended.

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#### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** Nonflammable.  
**AUTO-IGNITION TEMPERATURE:** Does not apply.  
**FIRE AND EXPLOSION HAZARDS:** Inert gases are noncombustible. However, if system should rupture due to a fire, these gases may displace air to the point where there is not enough oxygen to support life.  
**UPPER EXPLOSIVE / FIRE LIMITS:** Nonflammable gas. Not applicable.  
**LOWER EXPLOSIVE / FIRE LIMITS:** Nonflammable gas. Not applicable.  
**EXTINGUISHING MEDIA:** Krypton/Xenon cannot catch fire. Use media appropriate for surrounding fire.  
**SPECIAL FIRE FIGHTING PROCEDURES:** Krypton/Xenon are inert gases, and do not represent any fire hazard.

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#### 6. ACCIDENTAL RELEASE MEASURES

**SPILL OR LEAK PROCEDURES:** Evacuate spill or leak area, allow concentrated gas to dissipate, use ventilation to dissipate the gas into the atmosphere. Leaks should be quickly repaired, particularly in confined spaces. Use appropriate personal protective equipment.  
**WASTE DISPOSAL METHOD:** Gases may be vented slowly to a well ventilated outdoor location remote from personnel work areas and building air intakes. Do not dispose of any residual gas in compressed gas cylinders. Return the cylinders to the supplier with residual pressure.

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#### 7. HANDLING AND STORAGE

**STORAGE TEMPERATURE:** Must be stored with all the precautions necessary for safety with any

nonflammable, nontoxic, compressed gas.  
SHELF LIFE: Indefinite.  
HANDLING / STORAGE: Krypton/Xenon must be handled with all the precautions necessary for  
PRECAUTIONS: safe handling any nonflammable, nontoxic, compressed gas.

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

RECOMMENDED WORK / HYGIENE PROCEDURES: Follow safe work practices and precautions necessary for safety when using a nonflammable, nontoxic, compressed gases.  
EYE PROTECTION REQUIREMENTS: Chemical splash goggles or faceshield is advised to protect against the extremely cold gas.  
HAND PROTECTION REQUIREMENTS: Cold gases can cause frostbite injury upon contact with the hands. Hand protection such as insulated gloves shall be worn to prevent contact with cold gas or equipment and piping.  
PROTECTIVE CLOTHING REQUIREMENTS: Cold gases can cause frostbite injury upon contact with the skin. Clothing shall be worn to prevent contact with cold gas or equipment and piping.  
RESPIRATORY REQUIREMENTS: Positive pressure supplied air or self contained breathing apparatus is recommended for oxygen deficient atmospheres. Such equipment should be located conveniently to the place of work, but kept out of the area most likely to be contaminated. All respiratory equipment should be used consistent with OSHA 29 CFR 1910.134. Upper limit: Follow manufacturer's recommendations.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless.  
ODOR: Odorless.  
PHYSICAL STATE: Gas.  
DENSITY OF THE GAS: 0.2172 lb/ft<sup>3</sup> (at 70°F (21.1°C) and 1 atm) (Krypton)  
0.3416 b/ft<sup>3</sup> (at 70°F (21.1°C) and 1 atm) (Xenon)  
MELTING POINT: -251°F ( at 1 atm) (Krypton)  
-168°F ( at 1 atm) (Xenon)  
BOILING POINT: -244.0°F (at 1 atm) (Krypton)  
-162.6F (at 1 atm) (Xenon)  
SPECIFIC GRAVITY: 2.899 (at 70°F (21.1°C) and 1atm) (water = 1) (Krypton)  
4.560 (at 70°F (21.1°C) and 1atm) (water = 1) (Xenon)  
SOLUBILITY IN WATER: Slight.  
MOLECULAR WEIGHT: 83.80 (Krypton)-131.29 (Xenon)  
CHEMICAL FORMULA: Kr (Krypton)/Xe (Xenon)  
CHEMICAL FAMILY: Inert Gas

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## 10. STABILITY AND REACTIVITY

INSTABILITY CONDITIONS: Stable.  
INCOMPATIBILITIES: None known.  
DECOMPOSITION: Not applicable.  
HAZARDOUS POLYMERIZATION: Will not occur.

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## 11. TOXICOLOGICAL INFORMATION

ROUTES OF ENTRY: Inhalation

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EFFECTS OF ACUTE EXPOSURE:	Krypton / Xenon are simple asphyxiants. Air (oxygen) is displaced by Krypton / Xenon. As inert gases, they has no specific toxicity effect except to exclude oxygen from the lungs. The effect of simple asphyxiant gases is proportional to the extent to which they diminish the amount (partial pressure) of oxygen in the air that is breathed. The oxygen may be diminished to 75% of it's normal percentage in air before appreciable symptoms develop. This in turn requires the presence of a simple asphyxiant in a concentration of 33% in the mixture of air and gas. When the simple asphyxiant reaches a concentration of 50%, marked symptoms can be produced. A concentration of 75% is fatal in a matter of minutes.
SYMPTOMS:	The first symptoms produced by a simple asphyxiant are rapid respirations and air hunger. Mental alertness is diminished and muscular coordination is impaired. Later judgment becomes faulty and all sensations are depressed. Emotional instability often results and fatigue occurs rapidly. As the asphyxia progresses, there may be nausea and vomiting, prostration and loss of consciousness, and finally convulsions, deep coma and death.
EYE EFFECTS:	Nontoxic, noncorrosive, no effects noted.
SKIN EFFECTS:	Nontoxic, noncorrosive, no effects noted.
ACUTE INHALATION EFFECTS:	Simple asphyxiant.
CHRONIC EFFECTS / CARCINOGENICITY:	This agent is not considered a carcinogen by the NTP, IARC, or OSHA.
ORGANS AFFECTED BY LONG- TERM EXPOSURE:	A simple asphyxiant.

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## 12. ECOLOGICAL INFORMATION

Krypton, xenon are rare atmospheric gases and as such are non-toxic and are chemically inert. The extreme cold temperature (-244°C) will freeze organisms on contact, but no long term ecological effects are anticipated.

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## 13. DISPOSAL CONSIDERATIONS

When disposal becomes necessary, vent gas slowly to a well-ventilated outdoor location remote from personnel work areas and building air intakes. Do not dispose of any residual gas in compressed gas cylinders. Return cylinders to the supplier with residual pressure, the cylinder valve tightly closed. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

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## 14. TRANSPORTATION INFORMATION

D.O.T. SHIPPING NAME:	Rare gases and oxygen mixtures, compressed (krypton, Xenon)
D.O.T. HAZARD CLASS:	2.2
U.N. NUMBER:	UN 1980
D.O.T. PLACARD:	Nonflammable Gas
D.O.T. LABEL CODE:	Nonflammable Gas

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## 15. REGULATORY REQUIREMENTS

### EPA DETERMINATIONS

#### CERCLA, 40 CFR 302

The material does not contain hazardous substances which, when released in quantities triggers National Response Center notification requirements.

#### SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986,

##### TITLE III - SECTIONS 302, 304, 311, 312, 313

#### SECTION 302 / 304 - Extremely Hazardous Substances (40 CFR 355)

The material does not contain extremely hazardous substances at greater than 1.0 % concentration.

#### SECTION 311 / 312 - MSDS and Chemical Inventory Reporting Requirements (40 CFR 370)

The material should be reported under the following EPA Hazard categories.

- 4 Immediate (Acute Health Hazard)
  - Delayed (Chronic Health Hazard)
  - Fire
- 4 Sudden Release of Pressure
  - Reactive

#### SECTION 313 - List of Toxic Chemicals (40 CFR 372)

The material does not contain chemical(s) at a level of 1.0% or greater (0.1% for carcinogens) on the list of toxic Chemicals and is not subject to toxic chemical release reporting requirements.

#### TOXIC SUBSTANCES CONTROL ACT (TSCA) ( 40 CFR 710)

The material is a mixture as defined by TSCA. The chemical ingredients in this material are in the Section 8(b) Chemical Substance Inventory (40 CFR 710) and / or are otherwise in compliance with TSCA.

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### LIABILITY DISCLAIMER

The information contained in this Material Safety Data Sheet (MSDS) is believed to be correct since it was obtained from sources we believe are reliable. However no representation, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion.

Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.