



DAKOTA GASIFICATION COMPANY

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SAFETY DATA SHEET



RESPONSIBLE CARE®
OUR COMMITMENT TO SUSTAINABILITY

Section 1: Identification

Product identifier

Product Name • Krypton/Xenon

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

Recommended use • Specialty lighting, such as halogen headlights, lasers, and projector bulbs

Details of the supplier of the safety data sheet

Manufacturer • Dakota Gasification
420 County Road 26
Beulah, ND 58523-9400
United States
www.dakotagas.com

Telephone (General) • 701-873-2100

Emergency telephone number

Manufacturer: • (701) 873-6600
• 800-424-9300 - CHEMTREC

Section 2: Hazard Identification

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Compressed Gas - H280
Simple Asphyxiant

Label elements

OSHA HCS 2012

WARNING



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

Precautionary statements

Storage/Disposal • Protect from sunlight. Store in a well-ventilated place. - P410+P403

Other hazards

OSHA HCS 2012 • Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

Classification of the substance or mixture

WHMIS • Compressed Gas - A

Label elements

WHMIS



• Compressed Gas - A

Other hazards

WHMIS • This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.

In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

• Material does not meet the criteria of a substance.

Mixtures

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Krypton	CAS:7439-90-9	80% TO 95%	NDA	OSHA HCS 2012: Press. Gas - Comp.; Simp. Asphyx.	NDA
Xenon	CAS:7440-63-3	5% TO 9%	NDA	OSHA HCS 2012: Press. Gas - Comp.; Simp. Asphyx.	NDA
Oxygen	CAS:7782-44-7	3% TO 6.5%	NDA	OSHA HCS 2012: Press Gas - Comp; Skin Corr. 1A; Eye Dam. 1; Ox. Gas 1; Acute Tox. 1	NDA
Methane	CAS:74-82-8	0% TO 0.1%	NDA	OSHA HCS 2012: Flam. Gas 1; Press. Gas - Comp; Simp. Asphyx.	NDA

Section 4: First-Aid Measures

Description of first aid measures

- Inhalation** • IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.
- Skin** • Rare gases are inert and should not cause any skin effects.
- Eye** • Rare gases are inert and should not cause any eye effects.
- Ingestion** • Ingestion is not anticipated to be a likely route of exposure to this product.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

- Notes to Physician** • All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Other information

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the SDS to physician or other health professional with victim(s).

Section 5: Fire-Fighting Measures

Extinguishing media

- Suitable Extinguishing Media** • Use extinguishing agent suitable for type of surrounding fire.
SMALL FIRES: Dry chemical or CO₂.
LARGE FIRES: Water spray or fog.

- Unsuitable Extinguishing Media** • No data available

Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards** • Containers may explode when heated.
Ruptured cylinders may rocket.

- Hazardous Combustion Products** • No data available

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA). Move containers from fire area if you can do it without risk.
FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.
FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose

holders or monitor nozzles.

FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out.

FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.

FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions • Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not walk through spilled material. Ventilate the area before entry.

Emergency Procedures • Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

Environmental precautions

- Avoid run off to waterways and sewers.

Methods and material for containment and cleaning up

Containment/Clean-up Measures • Stop leak if you can do it without risk.
Do not direct water at spill or source of leak.
Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
If possible, turn leaking containers so that gas escapes rather than liquid.
Isolate area until gas has dispersed.
Ventilate the area.
Allow substance to evaporate.

Section 7 - Handling and Storage

Precautions for safe handling

Handling • Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

Conditions for safe storage, including any incompatibilities

Storage • Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines

	Result	ACGIH
Methane (74-82-8)	TWAs	1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)

Exposure controls

Engineering

Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

- In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face

- Wear safety glasses.

Skin/Body

- Wear leather gloves when handling cylinders.

Environmental

Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with no odor.
Color	Colorless	Odor	Odorless
Odor Threshold	No data available		
General Properties			
Boiling Point	-244 F(-153.3333 C) (Krypton)	Melting Point	-251 F(-157.2222 C) (Krypton)
Decomposition Temperature	No data available	pH	Not relevant
Specific Gravity/Relative Density	2.899 Water=1 Air equals 1(Krypton)	Density	0.2172 lb(s)/ft ³ @ 70 F(21.1111 C) (Krypton)
Water Solubility	Slightly Soluble	Viscosity	No data available
Explosive Properties	None under normal storage conditions.	Oxidizing Properties:	None under normal storage conditions.
Volatility			
Vapor Pressure	No data available	Vapor Density	1.45 Air=1 (Krypton)
Evaporation Rate	No data available		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	No data available
Flammability (solid, gas)	No data available		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- No data available

Incompatible materials

- None known.

Hazardous decomposition products

- Not applicable.

Section 11 - Toxicological Information

Information on toxicological effects

Component Name	CAS	Data
Oxygen (3% TO 6.5%)	7782-44-7	Acute Toxicity: ihl-rat TCLo:95 pph/24H; Reproductive: ihl-rat TCLo:10 pph/9H (22D preg)
Methane (0% TO 0.1%)	74-82-8	Acute Toxicity: ihl-mus LC50:326 gm/m3/2H
Xenon (5% TO 9%)	7440-63-3	Acute Toxicity: ihl-rbt TCLo:80 pph/15M
GHS Properties		Classification
Acute toxicity		OSHA HCS 2012•Data lacking
Aspiration Hazard		OSHA HCS 2012•Data lacking
Carcinogenicity		OSHA HCS 2012•Data lacking
Germ Cell Mutagenicity		OSHA HCS 2012•Data lacking
Skin corrosion/Irritation		OSHA HCS 2012•Data lacking
Skin sensitization		OSHA HCS 2012•Data lacking
STOT-RE		OSHA HCS 2012•Data lacking
STOT-SE		OSHA HCS 2012•Data lacking
Toxicity for Reproduction		OSHA HCS 2012•Data lacking
Respiratory sensitization		OSHA HCS 2012•Data lacking
Serious eye damage/Irritation		OSHA HCS 2012•Data lacking

Route(s) of entry/exposure • Inhalation, Skin, Eye

Potential Health Effects

Inhalation

Acute (Immediate) • If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness,

unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

**Chronic
(Delayed)**

- No data available

Skin

**Acute
(Immediate)**

- Rare gases are inert and should not cause any skin effects.

**Chronic
(Delayed)**

- No data available

Eye

**Acute
(Immediate)**

- Rare gases are inert and should not cause any eye effects.

**Chronic
(Delayed)**

- No data available

Ingestion

**Acute
(Immediate)**

- Ingestion is not anticipated to be a likely route of exposure to this product.

**Chronic
(Delayed)**

- No data available

Key to abbreviations

LC = Lethal Concentration

TC = Toxic Concentration

Section 12 - Ecological Information

Toxicity

- Non-mandatory section - information about this substance not complied for this reason.

Persistence and degradability

- Non-mandatory section - information about this substance not complied for this reason.

Bioaccumulative potential

- Non-mandatory section - information about this substance not complied for this reason.

Mobility in Soil

- Non-mandatory section - information about this substance not complied for this reason.

Other adverse effects

- Non-mandatory section - information about this substance not complied for this reason.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging • Dispose of content and/or container in accordance with local, regional, national, and/or

waste international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	UN1956	Compressed Gas, n.o.s. (Krypton, Xenon)	2.2	NDA	NDA
TDG	UN1956	Compressed Gas, n.o.s. (Krypton, Xenon)	2.2	NDA	NDA
IATA/ICAO	UN1956	Compressed Gas, n.o.s. (Krypton, Xenon)	2.2	NDA	NDA

Special precautions for user

- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- No data available

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • Acute, Pressure(Sudden Release of)

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	Korea KECL
Krypton	7439-90-9	Yes	No	Yes	No	Yes
Methane	74-82-8	Yes	No	Yes	No	Yes
Oxygen	7782-44-7	Yes	No	Yes	No	Yes
Xenon	7440-63-3	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

•Krypton	7439-90-9	A
•Oxygen	7782-44-7	A, C
•Methane	74-82-8	A, B1
•Xenon	7440-63-3	A

Canada - WHMIS - Ingredient Disclosure List

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

Environment

Canada - CEPA - Priority Substances List

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

Inventory - United States - Section 8(b) Inventory (TSCA) - PMN Number to EPA Accession Number Link

•Krypton	7439-90-9	Not Listed
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•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

•Krypton	7439-90-9	Not Listed
•Oxygen	7782-44-7	Not Listed
•Methane	74-82-8	Not Listed
•Xenon	7440-63-3	Not Listed

Section 16 - Other Information

Last Revision Date	• 18/March/2014
Preparation Date	• 28/January/2010
Disclaimer/Statement of Liability	• The information contained in this Safety Data Sheet (SDS) 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.

Key to abbreviations

NDA = No data available
