

SAFETY DATA SHEET

Natural Gas - Dry

Revision Date: 2/3/2021

SECTION 1: IDENTIFICATION	
(a) PRODUCT IDENTIFIER:	(b) OTHER MEANS OF IDENTIFICATION:
Natural Gas - Dry	Methane, Gas, CH ₄ , Dry Gas, Process Gas, Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG), Sweet Gas, Sour Gas, Fuel Gas, Sales Gas, Buyback Gas, Fuel Gas Supply Gas, Blend Gas, Production Stream

(c) Description: A production stream consisting primarily of dry natural gas with residual mineral contents and residual chemicals.


(d) Recommended Use: Fuel for heating and industrial process applications.

Restrictions On Use: Not to be used for anything other than recommended use.

(e) Manufacturer:

Flywheel Energy • 621 North Robinson, Suite 300 • Oklahoma City, OK 73102 • 405-702-6991

(f) 24 HR EMERGENCY ASSISTANCE PHONE NUMBER: CHEMTREC: (833) 604-8137

SECTION 2: HAZARDS IDENTIFICATION				
This product has not been tested by Flywheel Energy to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components. The categories of Health Hazards as defined in OSHA 29 CFR 1910.1200 Hazard Communication Standard have been evaluated and are listed below. Refer to Sections 3, 8, and 11 for additional information.				
Hazard Classification	(a) Hazard Category	(b) Hazard Symbols	(b) Signal Word	(b) Hazard Statement
Acute Toxicity	2		Danger Warning	H331 - Toxic if inhaled
Flammable Gas	1			H220 - Extremely flammable gas.
Gases Under Pressure	Liquefied Gas			H280 - Contains gas under pressure; may explode if heated.
Specific Target Organ Toxicity	3			H335 - May cause damage to central nervous and respiratory systems.

Health Hazard Precautionary Statements (b)	
P210	Keep away from heat, sparks, open flames, hot surfaces. No smoking.
P261	Avoid breathing gas, vapors or spray.
P377	Leaking gas fire: Do not extinguish unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P403	Store in well-ventilated area.

Other Hazards: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. Asphyxiant gas, can be fatal. May cause damage to the blood, central nervous system, and cardiovascular system. High concentrations of gas can cause unconsciousness and death. Being under the influence of alcohol may enhance the effects if exposed.

SECTION 3: COMPOSITION / INFORMATION OF INGREDIENTS		
(a)Chemical name	(c)CAS No.	(b)% Weight
Natural Gas	8006-14-2	100
Methane (C1)	74-82-8	95-99
Ethane (C2)	74-84-0	0-1.5
Propane (C3)	74-98-6	0-0.3
iso-Butane (iso_C4)	75-28-5	0-0.4
n-Butane (n_C4)	109-66-0	0-0.7
iso-Pentane	78-78-4	0-0.1
n-Pentane (n_C5)	109-66-0	0-0.1
Hexane (C6)	110-54-3	0-0.3
Carbon Dioxide (CO2)	124-38-9	0-2.3
Nitrogen (N2)	7727-38-9	0.1-0.3
Hydrogen Sulfide (H2S)	7783-6-4	Varies

SECTION 4: FIRST AID MEASURES

(a) Description of necessary measures:

INHALATION:	Move to fresh air immediately. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately. Call 911. In addition, signs and symptoms of H ₂ S toxicity may be present.
INGESTION:	This material is a gas under normal atmospheric conditions and ingestions is unlikely. Seek medical help immediately.
SKIN CONTACT:	If injury is due to pressure, treat abrasions/contusions symptomatically. Remove contaminated clothing. In case of blistering, frostbite or freeze burns seek immediate medical attention.
EYE CONTACT:	If injury is due to pressure, treat abrasions/contusions symptomatically. In case of freeze burn cover eyes to protect from light and then seek medical attention.

Most important symptoms/effects:

- **Acute:** Skin, eye, and mucous membrane irritation

Natural Gas - Dry

Revision Date: 2/3/2021

- **Delayed:** none identified

Indication of immediate medical attention and special treatment: Significant over-exposure/inhalation

Notes to physician: Medical providers are urged to contact a Regional Poison Center. Treat symptomatically and supportively. This material may contain or release hydrogen sulfide. In high doses, hydrogen sulfide may produce pulmonary edema and respiratory depression or paralysis.

General advice: In the case of accident or if you feel unwell, seek medical advice immediately. Show this safety data sheet to the doctor in attendance. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

SECTION 5: FIRE FIGHTING MEASURES

(a) Suitable extinguishing media: Dry chemical, firefighting foam, carbon dioxide, Halon or water spray. Water may be ineffective on flames but useful for other purposes; including cooling heated surfaces or preventing the creation of static electricity. Fire should not be extinguished unless flow of gas can be immediately stopped.

(b) Specific hazards arising from the chemical: Gas is extremely flammable and may readily be ignited by static charge, sparks and flames. A hazard from re-ignition and explosion exists if the flame is extinguished without stopping flow of gas and/or cooling surroundings and eliminating ignition source. Gas may travel a considerable distance to a source of ignition and flash back. Combustion may produce carbon dioxide and water with trace amounts of carbon monoxide, nitrogen oxides, sulfur oxides, aldehydes and soot.

(c) Special protective equipment and precautions for fire-fighters: Firefighters should wear self-contained breathing apparatus (SCBA) and full protective clothing.

(d) Flammability/Explosivity: Lower explosive limit: 4%; Upper explosive limit: 15%
NFPA Rating: Health: 2, Flammability: 4, Reactivity: 0



(e) Hazardous Decomposition Products: When heated to decomposition, toxic fumes including carbon monoxide, carbon dioxide and Sulphur Dioxide may be generated.

SECTION 6: ACCIDENTAL RELEASE MEASURES

(a) Personal precautions, Protective equipment, and Emergency procedures: If it can be done safely, stop the source of the leak or release. Keep unauthorized personnel away and upwind. Many gases are heavier than air and will spread along the ground and settle in low areas. Keep out of low areas. Eliminate all ignition sources (no smoking, flares, sparks or flames in the immediate area). Ground all equipment that must be used in the area. Follow prescribed procedures for reporting and responding to releases.

(b) Methods and materials for containment and cleaning up: If it can be done safely, stop the source of the leak or release. Prevent spreading of vapors through ventilation systems and confined areas. Isolate area until gas has dispersed. Use personal protection recommended in Section 8.

SECTION 7: HANDLING AND STORAGE

(a) Precautions for safe handling: Handle in accordance with good industrial hygiene and safety practices. These practices include, but are not limited to, avoiding unnecessary exposure and prompt removal of material from eyes, skin, and clothing. If needed, take first aid actions as indicated in Section 4.

Handle as flammable. Keep away from heat, sparks and open flame. No smoking. Use only with adequate ventilation. May release or contain dangerous levels of H₂S. Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Non-sparking tools should be used. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self-closing valves, pressure vacuum bungs and flame arrestors. Review all operations which have the potential of generating and accumulating electrostatic charge and/or flammable atmosphere. Use appropriate mitigating procedures. Do not enter confined spaces without following proper entry procedures. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

Scales, deposits and sludge from equipment associated with this product may have accumulation of Naturally Occurring Radioactive Materials (NORM). Equipment should be assessed for external gamma radiation.

(b) Conditions for safe storage, including any incompatibilities: Keep away from flame, sparks, excessive temperatures and open flame. No smoking. Maintain vessels closed and clearly labeled. Empty vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose these vessels to sources of ignition. This material may contain or release H₂S. In a tank or other closed container, the vapor space above this material may accumulate hazardous concentrations of H₂S. Do not enter confined spaces without following proper entry procedures. Use appropriate containment to avoid environmental contamination.

Incompatibilities: Keep away from strong oxidizers, ignition sources and heat.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:					
Components	(a) OSHA ⁽¹⁾	(a) ACGIH ⁽¹⁾	(a) NIOSH ⁽²⁾	(a) IDLH ⁽⁴⁾	Units
Natural Gas	N/A	Simple Asphyxiant	N/A	N/A	N/A
Methane (C1)	N/A	Simple Asphyxiant	N/A	N/A	PPM
Ethane (C2)	N/A	Simple Asphyxiant	N/A	N/A	PPM
Propane (C3)	1,000	Simple Asphyxiant	1,000	2,100	PPM
iso-Butane (iso_C4)	N/A	1,000 ⁽³⁾	800	N/A	PPM
n-Butane (n_C4)	N/A	1,000 ⁽³⁾	800	1,600	PPM
iso-Pentane (iso_C5)	N/A	1,000	120	1,500	PPM
n-Pentane (n_C5)	1,000	1,000	120 610 (REL-C)	1,500	PPM
Hexane (C6)	500	50 ⁽⁴⁾	50	1,100	PPM

SAFETY DATA SHEET

Natural Gas - Dry

Revision Date: 2/3/2021

Carbon Dioxide (CO ₂)	5,000	5,000 30,000 (STEL)	5,000 30,000 (STEL)	40,000	PPM
Nitrogen (N ₂)	N/A	Simple Asphyxiant	N/A	N/A	PPM
Hydrogen Sulfide (H ₂ S)	20 (Max)	5 (STEL)	10 (Max)	100	PPM

- (1)8-hour Time Weighted Average (TWA) unless otherwise specified.
- (2)10-hour TWA unless otherwise specified.
- (3)Exposure limit given as Aliphatic hydrocarbon gases: Alkanes [C1-C4].
- (4)ACGIH has established a Biological Exposure Index (BEI) for this substance.
- N/A: Not Applicable
- STEL: 15-minute Short Term Exposure Limit
- REL-C: Concentration not to be exceeded at any time

(b) Appropriate engineering controls: Provide adequate general and local exhaust ventilation to: (1) Maintain airborne chemical concentrations below applicable exposure limits, (2) Prevent accumulation of flammable vapors and formation of explosive atmospheres, and (3) Prevent formation of oxygen deficient atmospheres, especially in confined spaces.

(c) Individual protection measures:

Eye/face protection: Safety glasses with side shields are required standard PPE. Wear chemical goggles when working with liquid natural gas.

Skin Protection: Avoid skin contact. Use impervious gloves. PVC and neoprene may be suitable for incidental contact. Nitrile rubber should be used for longer term protection when prolonged or frequent contact may occur. Gloves should be worn on clean hands and hands should be washed after removing gloves. Also wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities or leaving work. Fire Resistant Clothing (FRC) is required standard PPE. Insulated clothing and/or gloves should be worn where liquid or expanding gas may be generated.

Respiratory protection: A NIOSH-approved respirator must be worn where controls do not maintain airborne concentrations below occupational exposure limits. H₂S MAY BE PRESENT OR RELEASED. NIOSH-approved respiratory protection should be used when handling high or unknown hydrogen sulfide content and to reduce airborne concentrations to allowable occupational exposure levels.

General hygiene considerations: Always observe good personal hygiene measures, such as washing after handling the material, and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES	
Physical and Chemical Properties	
	Solution:
(a) Appearance:	Colorless
(b) Odor:	Odorless
(c) Odor Threshold:	N/A
(d) pH:	N/A

SAFETY DATA SHEET

Natural Gas - Dry

Revision Date: 2/3/2021

(e) Melting point/Freezing point:	N/A
(f) Boiling point/range:	-259 °F
(g) Flash Point:	-306 °F
(h) Evaporation rate:	N/A
(i) Flammability:	N/A
(j) UFL/LFL or UEL/LEL:	4.5%/15.0% by volume
(k) Vapor pressure:	40 atm at -187 °F
(l) Vapor density:	0.6 g/l
(m) Relative density:	0.57-0.62 g/l
(n) Solubility:	3.5 mL/100 mL water at 62.6 °F
(o) Partition coefficient:	N/A
(p) Auto-ignition temperature:	900-1170 °F
(q) Decomposition temperature:	Evaporation or ignition likely before decomposition will occur
(r) Viscosity:	N/A
(s) Specific Gravity 60/60F:	0.4 at -263 °F
(t) % Volatile by Volume:	100%

SECTION 10: STABILITY AND REACTIVITY

- (a) **Reactivity:** Stable under normal conditions.
- (b) **Chemical stability:** Stable under normal conditions.
- (c) **Possibility of hazardous reactions:** Heat will increase the pressure of gas in cylinders and may cause an explosion.
- (d) **Conditions to avoid (e.g., static discharge, shock, or vibration):** Keep material away from heat, sparks, open flames, and oxidizers such as chlorine.
- (e) **Incompatible materials:** Natural Gas readily mixes with air when released and creates a combustible atmosphere. Some other strong oxidizing agents with which it can burn or explode in confined areas are: chlorine, bromine pentafluoride, oxygen difluoride and nitrogen trifluoride. It will ignite spontaneously when mixed with chlorine dioxide.
- (f) **Hazardous decomposition products:** Combustion may produce carbon dioxide and water with trace amounts of carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons, aldehydes, and soot.

SECTION 11: TOXICOLOGICAL INFORMATION

- (a) **Information on likely routes of exposure:**
- **Inhalation:** Most common route of exposure. Simple asphyxiant.
 - **Ingestion:** Ingestion not likely.
 - **Skin contact:** Skin absorption not likely. Protect against pressurized gas.
 - **Eye contact:** Eye absorption not likely. Protect against pressurized gas.
- (b) **Symptoms related to physical, chemical and toxicological characteristics:** At high concentrations, inhalation can cause symptoms of oxygen deprivation (asphyxiation), which includes shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting, which are reversible when

SAFETY DATA SHEET

Natural Gas - Dry

Revision Date: 2/3/2021

exposure ceases. Continued exposure can lead to hypoxia (inadequate oxygen), unconsciousness and death. Ethane and propane have been shown to cause cardiac sensitization in some studies in laboratory animals. When gas is incompletely combusted, hazardous by-products can be produced such as carbon monoxide, which can cause carbon monoxide poisoning), and other potentially harmful substances. Skin and eye contact with rapidly expanding or liquefied gas may cause irritation, frostbite, discoloration of the skin and the potential for blindness.

(c) Delayed and immediate effects/chronic effects from short- and long-term exposure:

- **Target Organs:** Skin. Eyes. Respiratory system. Cardiovascular system. Bone marrow. Liver. Kidneys. Central nervous system.
- **Chronic Effects:** Prolonged exposure to Natural gas can lead to hypoxia, bluish coloration to the skin, numbness, damage to the nervous system, heart sensitization, reduced consciousness and death. Prolonged or repeated inhalation of Isopentane may cause dizziness, weakness, weight loss, anemia, nervousness, pains in the limbs and peripheral numbness.
- **Carcinogenicity:** This product does not contain any carcinogens or potential carcinogens as listed by ACGIH, IARC, OSHA, or NTP.
- **Mutagenicity:** N/A
- **Reproductive Effects:** N/A
- **Developmental Effects:** N/A
- **Teratogenicity:** N/A

(d) Numerical measures of toxicity:

Component Toxicity				
Chemical name	CAS No.	LD50 Oral	LD50 Dermal	LC50
Natural Gas	8006-14-2	N/A	N/A	N/A
Methane (C1)	74-82-8	N/A	N/A	N/A
Ethane (C2)	74-84-0	N/A	N/A	N/A
Propane (C3)	74-98-6	N/A	N/A	N/A
iso-Butane (iso_C4)	75-28-5	N/A	N/A	570,000 ppm (rat); 15M
n-Butane (n_C4)	109-66-0	N/A	N/A	658,000 mg/m ³ (rat); 4H
iso-Pentane	78-78-4	N/A	N/A	N/A
n-Pentane (n_C5)	109-66-0	400mg/kg (rat)	N/A	364,000 mg/m ³ (rat); 4H
Hexane (C6)	110-54-3	28,710mg/kg	N/A	N/A
Carbon Dioxide (CO2)	124-38-9	N/A	N/A	N/A
Nitrogen (N2)	7727-38-9	N/A	N/A	N/A
Hydrogen Sulfide (H2S)	7783-6-4	N/A	N/A	N/A

SECTION 12: ECOLOGICAL INFORMATION

- (a) Ecotoxicity:** Petroleum gases will readily evaporate from the surface and would not be expected to have significant adverse effects in the aquatic environment. Liquid release is only expected to cause localized freezing and other non-persistent environmental changes

Natural Gas - Dry

Revision Date: 2/3/2021

- (b) **Persistence / Degradability:** N/A
- (c) **Bioaccumulation / Accumulation:** There is no information available on the ecotoxicological effects of natural gas. Because of the high volatility of natural gas, it is unlikely to cause ground or water pollution. Natural gas released into the environment will disperse rapidly into the atmosphere and undergo photochemical degradation.
- (d) **Mobility in Soil:** N/A

SECTION 13: DISPOSAL CONSIDERATIONS

This product is a gas and typically would not be managed as a waste. If necessary, allow to dissipate to the atmosphere (if permitted by federal/provincial/municipal requirements). Dispose in a safe location, preferably by burning with a flare. If disposal of natural gas cannot be flared, care must be taken to ensure complete dissipation of the gas to a concentration below its flammable limits.

SECTION 14: TRANSPORT INFORMATION

- a) **Classification:** Class 2.1 Flammable Gases
- b) **Placard:** 
- c) **UN/PIN Number:** 1971
- d) **Shipping Description:** Natural gas, compressed with high methane content
- e) **Special Shipping Information:** Handle as extremely flammable gas. Precaution should be taken to minimize inhalation of natural gas.

SECTION 15: REGULATORY INFORMATION

- a) **CERCLA Hazardous Substances (Section 103)/RQ:** This product is not subject to CERCLA reporting requirements as it is sold. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.
- b) **EPA SARA (Section 311/312) Hazard Classification:** Acute Health, Fire Hazard, Pressure Hazard. SARA 313: This product contains the following chemicals subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372): None.
- c) **US EPA Toxic Substances Control Act:** All of the components of this product are listed on the TSCA inventory.
- d) **CALIFORNIA PROPOSITION 65 WARNING:** Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

SECTION 16: OTHER INFORMATION

THIS INFORMATION RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. SUCH INFORMATION IS TO THE BEST OF THIS COMPANY'S KNOWLEDGE AND BELIEVED ACCURATE AND RELIABLE AS OF THE DATE INDICATED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE IS MADE AS TO THE ACCURACY, RELIABILITY OR COMPLETENESS. IT IS THE USER'S RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF SUCH INFORMATION FOR HIS OWN PARTICULAR USE.

Abbreviations and acronyms:

N/A – Not Applicable or Not Available

N/R – Not Regulated

CAS – Chemical Abstract Service

OSHA – US Occupational Safety and Health Organization

PEL – OSHA Permissible Exposure Limits

ACGIH – American Conference of Governmental Industrial Hygienists

TLV – ACGIH® Threshold Limit Values

REL – Recommended Exposure Limits

IDLH – Immediately Dangerous to Life or Health

TWA – Time Weighted Average – Average exposure over a specified period of time (i.e., 8 hours)

STEL - a 15-minute TWA exposure that should not be exceeded at any time during a work day.

REL-C – Exposure limit which shall at no time be exceeded during the work day.

NE – None Established

APF – Assigned Protection Factor – the level of respiratory protection that a respirator is expected to provide.

UEL – Upper Explosive Limit – Highest concentration (percentage) of a gas or vapor in air capable of producing a flash fire in the presence of an ignition source

LEL – Lower Explosive Limit – Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash fire in the presence of an ignition source.

UFL – Upper Flammability Limit - Maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.

LFL – Lowest concentration at which a flammable mixture of gas or vapor in air can ignite at a given temperature and pressure.

IARC – International Agency for Research on Cancer

NTP – National Toxicology Program

NIOSH - National Institute for Occupational Safety and Health

NOAA – National Oceanic and Atmospheric Administration

GHS - Globally Harmonized System of Classification and Labeling of Chemicals

ECHA - European Chemicals Agency

Date of Preparation: December 4, 2021

Date of Last Change: February 3, 2021